Margherita Pryor
U.S. Environmental Protection Agency, Region 1
5 Post Office Square
Boston MA 02109

June 8, 2020

Dear Margherita:

We are pleased to submit Massachusetts Bays National Estuary Program's (MassBays') application for funding to implement our Federal Fiscal Year 2020 Workplan. In spite of the imposition of stay-at-home mandates from the Governor, MassBays staff and regional coordinators have accomplished much in this past year, for example:

- Publishing a new ArcGIS Story Map providing online, interactive access to data gathered through our Ecosystem Delineation and Assessment effort.
- Beta-testing of our new app, AquaQAPP, which will make Quality Assurance Project Plan development easier for community-based monitoring groups.
- Launching new coastal acidification monitoring efforts in Duxbury and Salem Harbors to assess local pH and carbonate chemistry.
- Unveiling of a new "State of the Waters; Cape Cod" scoring tool to prompt action on the part of Cape Cod municipalities for improved water quality.
- Renewing local commitments to bring together state and local governments around water quality concerns on the Merrimack River.
- Engaging underserved Boston-area youth in a High School Marine Science Symposium and the Coastal Ocean (Summer 2019) Science Academy.

MassBays' Management Committee reviewed and approved this application, and endorsed the tasks included as important steps toward implementing our CCMP.

Please do not hesitate to contact us if you have any comments, suggestions, or concerns regarding the workplan.

Sincerely,

Pam DiBona
Executive Director
Massachusetts Bays National Estuary Program
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Kristin Uiterwyk
Management Committee Chair
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cc: Lisa Berry Engler, EEA/CZM

Contents

Acronyms and Abbreviations

ANEP	Association of National Estuary Programs
APCC	Association to Preserve Cape Cod
BCG	Biological Condition Gradient
BHEN	Boston Harbor Ecosystem Network
BU	Boston University
CC	Cape Cod (MassBays Region)
CCC	Cape Cod Commission
CCCD	Cape Cod Conservation District
CCMP	Comprehensive Conservation and Management Plan
CCS	Center for Coastal Studies
CCWRRP	Cape Cod Water Resources Restoration Project
CERF	Coastal and Estuarine Research Foundation
CMCN	Citizen Monitoring Coordinators' Network
CRC	Barnstable County (Cape Cod) Coastal Resources Commission
CS	Central Staff (MassBays Boston Office)
CSA	Citizen Science Association
CSO	Coastal States Organization *or* Combined Sewer Overflow
CWA	Federal Clean Water Act
CZM	MA Office of Coastal Zone Management
DCR	MA Department of Conservation and Recreation
DEP	MA Department of Environmental Protection
DER	MA Department of Fish and Game, Division of Ecological Restoration
DMF	MA Department of Fish and Game, Division of Marine Fisheries
DPW	Department of Public Works
ED	Executive Director, MassBays
EDA	Estuary Delineation and Assessment
EPA	U.S. Environmental Protection Agency
FEGS	Final Ecosystem Goods and Services
FTE	Full-time Equivalent
GOMC	Gulf of Maine Council on the Marine Environment
IOOSA	Integrated Ocean Observing Systems Association
IRWA	Ipswich River Watershed Association
ISA	Interagency Service Agreement
LGC	Local Governance Committee
LID	Low Impact Development
LNS	Lower North Shore (MassBays Region)
LOE	Level of Effort
MC	Management Committee
Mass Audubon	Massachusetts Audubon Society
MassBays	Massachusetts Bays National Estuary Program
MassDOT	MA Department of Transportation
MB	Metro Boston (MassBays Region)
MBL	Marine Biological Laboratory
MCCA	Massachusetts Coastal Condition Assessment
MET	Massachusetts Environmental Trust
MIT Sea Grant	MIT Sea Grant College Program
MOP	Massachusetts Oyster Project
MOTN	Marine & Oceanographic Technology Network
MME	Massachusetts Marine Educators
MPG	Multipurpose Program Grant
MS4	Municipal Separate Storm Sewer Systems
MVP	Municipal Vulnerability Preparedness

Acronyms and Abbreviations, continued

MVPC	Merrimack Valley Planning Council
MWRA	Massachusetts Water Resources Authority
MRWC	Merrimack River Watershed Council
MyRWA	Mystic River Watershed Association
NECC	Northern Essex Community College
NEOSEC	New England Ocean Science Education Collaborative
NEP	National Estuary Program
NEPORT	NEP On-line Reporting Tool
NERACOOS	Northeast Regional Association of Coastal and Ocean Observing Systems
NERRA	National Estuarine Research Reserve Association
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NS	North Shore (LNS + UNS MassBays regions)
NSRWA	North and South Rivers Watershed Association
NU	Northeastern University
NUMSC	Northeastern University Marine Science Center
NWF	National Wildlife Federation
NWR	National Wildlife Refuge
O&M	Operations and Management Plan
ORD	Office of Research and Development, EPA
OST	Office of Science and Technology, EPA Headquarters
PIE-Rivers	Parker-Ipswich-Essex Rivers Restoration Partnership
PRNWR	Parker River National Wildlife Refuge
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RC	Regional Coordinator
RCC	Restoration Coordination Center (Cape Cod)
RPA	Regional Planning Agency
RSP	Regional Service Provider
SLR	Sea Level Rise
SSCW	Salem Sound Coastwatch
SS	Staff Scientist, MassBays OR South Shore (MassBays Region)
SSU	Salem State University
STAC	Science and Technical Advisory Subcommittee, MassBays
SWIM	Safer Waters in Massachusetts
TNC	The Nature Conservancy
TTOR	The Trustees of Reservations
UMCES-IAN	UMd Center for Environmental Studies, Integration and Application Network
UHI	Urban Harbors Institute
UNH	University of New Hampshire
UNS	Upper North Shore (MassBays Region)
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
U/U	Underserved/underrepresented
WAA	Watershed Action Alliance
WBNERR	Waquoit Bay National Estuarine Research Reserve
WHOI	Woods Hole Oceanographic Institution
WWTP	Wastewater Treatment Plant

A. Summary

2019-2020 Progress and Accomplishments

In our annual ***NEPORT reporting*** to EPA for October 2018 through September 2019, MassBays submitted documentation of 440 acres of estuarine habitat restored, and leveraged funding of more than $1.2Million, or $2 in cash and in-kind support secured for every $1 invested by EPA. This latter is in addition to the 1:1 non-federal resources put forward as direct match to EPA's funding under Section 320.

In July 2019 we received comments on our revised draft ***Comprehensive Conservation and Management Plan*** from EPA Region 1, and subsequently from EPA Headquarters. An overview of the Goals-Strategies-Actions-Activities and Measures is included here as Table 1. Appendix A lists completed tasks aligned with the outputs per Action.

In our CCMP, MassBays has set out a novel approach to NEP planning, one based on adaptive management informed by regular monitoring and assessment of environmental conditions. Unfortunately the standard CCMP guidance is not based on this approach, so final approval of our CCMP is pending the first round of target-setting (whereas our CCMP includes that step as Strategy 3.1). Rather than rush to set out artificial environmental goals for the 47 embayments and 22 inter-estuarine areas, MassBays' Management Committee has chosen to fully implement Strategy 3.1 prior submitting a final CCMP. Meanwhile, EPA has accepted the current, revised version of the CCMP goals, strategies, and actions as a "Working CCMP" on which to base our annual workplans. The scope of work proposed here is consistent with that CCMP.

We have made steady progress on Strategy 3.1, and with the help of EPA's Office of Research and Development and Office of Science and Technology we have met several interim objectives, including:

- Determining "ecotypes" based on hydrologic and geomorphic characteristics to characterize the embayments.
- Compiling historical data regarding the presence and extent of near-shore natural resources.
- Identifying an approach to bring stakeholder input to the process of target-setting.
- Engaging additional participants in our Science and Technical Advisory Subcommittee to expand capacity for generating ecosystem-based target conditions.
- Finalizing embayment categories based on ecosystem delineation assessment data compiled in 2018.

Meanwhile MassBays' Regional Service Providers (RSPs) continue ***on-the-ground work with partners*** in our five subregions, providing technical support to municipalities, generating and sharing monitoring data with state, local, and federal agencies, and conducting outreach to multiple audiences.

See ***Section B, Completed Major Projects***, for more detail on these and other accomplishments.

Table 1. *MassBays' Working CCMP Goals, Strategies, Actions, Activities, Target Dates, Partners, and Measures/Outputs. Progress to date is compiled is Appendix A to this Workplan.*

Goal 1. MassBays provides new resources to support research and management in the Bays.				
Strategy 1.1: Make new data available, especially to address specific gaps in knowledge				
Action	**Activities**	**year(s)**	**partners (roles)**	**measures/outputs**
1.1.a Identify gaps in data sets.	Compile data needs for measuring progress toward targets & State of the Bays reporting Generate a master list of data gaps, beginning with those highlighted by stakeholders in 2015 & 2018	ongoing	STAC,/MC, LGCs (id data gaps)	MassBays provides evidence that data needs drive activities in annual workplans, and informs target-setting and SotB documentation By 2019, post a master list of data gaps, to be updated annually on the MassBays website By 2020, establish a means for soliciting data needs from partners and community members
1.1.b. Prioritize addressing gaps per need, completeness and reliability of new and existing data, relevance to underserved/underrepresented communities, application to State of the Bays reporting, and potential policy applications	Reference 314 CMR 4 (Mass water quality standards) in prioritization Determine minimum dataset (number of years, sites, etc.) required to address need	ongoing	STAC, others (prioritize data gaps)	Annual STAC meeting dedicated to prioritization of data needs. List of priority data gaps included in each SotB, EDA update Diverse stakeholders provide input to MassBays' actions to address data gaps.
1.1.c Maintain Estuarine Delineation and Assessment as a record of **current** data availability	Inventory near-shore and estuarine data sets available for the Bays Publish online ARCGIS Storymap	2019, 2022, 2026	Consultant (data compilation, update and analysis); Monitoring and research community (audience)	Produce EDA 2.1 by 2019, EDA 3.0 by 2022, and EDA 4.0 by 2026 Online ARCGIS Storymap providing georeferenced, interactive access to EDA data by assessment unit (2019) By 2022, MassBays documents that researchers and others utilize the EDA Story Map as a launching-off place for their work in the Bays

Strategy 1.1: Make new data available, especially to address specific gaps in knowledge, *continued*				
Action	**Activities**	**year(s)**	**partners (roles)**	**measures/outputs**
1.1.d Provide input re: data needs to entities funding and conducting monitoring and restoration	Disseminate list of data gaps to researchers and monitoring groups Prompt and maintain focus on management outcomes of data analysis and research Identify funders, undertake education to promote investments in baseline data sets Support graduate and undergraduate student research and monitoring programs Support new studies or monitoring efforts to address gaps	ongoing	NERACOOS, EPA, DEP, MET, others (funding); Citizen Monitoring Coordinators' Network, graduate and undergraduate universities and colleges, watershed associations, RPAs, MACC, MOTN, PIE LTER, NERACOOS (monitoring and audience)	DEP-funded 2020-2023 probabilistic coastal monitoring program (EPA CWA S.106 grant) completed by MassBays Each year, address at least one data gap per year via research, management, or monitoring through the Healthy Estuaries Grant Program (or other) All MassBays-funded grants document their project's connection to policy/resource management

Strategy 1.2 Support valid (QA/QC) data collection and application				
Action	**Activities**	**year(s)**	**partners (roles)**	**measures/outputs**
1.2.a Implement a MassBays-wide monitoring framework that incorporates long-term monitoring program data and makes data and findings available to the public	Apply monitoring framework for data set evaluation Access/download data for analysis and other uses	ongoing	DEP, EPA, academia, ngo monitoring groups (data generation); northeast ocean data portal, CUAHSI, EPA, DEP, NERACOOS (data sharing & access)	Maintain updated inventory of monitoring programs in the Bays relevant for conditions and trends analysis. By 2021, document baseline conditions for future comparisons MassBays' ecoreport card (2021, Action 1.3.c) incorporates data sets that meet criteria set out by the Monitoring Framework
1.2.b Convene and partner with citizen monitoring coordinators, researchers, QA/QC agency staff, others to support and improve monitoring outputs	Develop online sampling & analysis plan generator (AquaQAPP) Provide one-on-one assistance for statistical analysis, volunteer training, etc. for locally based efforts Support Citizen Montitoring Coordinators' Network Engage with national and international networks on data quality issues	ongoing	DEP, EPA (funding); RCs, circuit rider (tech support) ANEP, Citizen Science Association (external connections), River Herring Network, CitMon Coordinators' Network, Mass Rivers Alliance (convening partners)	By 2021, successfully complete 2018 Exchange Network Grant deliverables: AquaQAPP, circuit rider hire, training, and deployment Regular CitMon Network meetings Regular participation in national citsci data quality evaluation networks A robust CitMon Network provides quality data to MassBays and others MassBays is a recognized partner in efforts to lend credibility to citizen science outputs

Strategy 1.3 Analyze and present existing data in multiple formats to document baselines and trends				
Action	**Activities**	**year(s)**	**partners, roles**	**measures/outputs**
1.3.a Analyze connections among datasets and trends to inform reporting, actions, and policies	Analyze existing datasets to identify trends Standardize metadata across regions to support Bays-wide roll-up for State of the Bays in 2020, 2025 Disseminate findings to local, state, and federal agencies with direct reference to policy implications	ongoing	UMCES/IAN, MIT Sea Grant (data management);	Standard metadata for assessing data from multiple sources By 2020, specific parameters are identified for cross-comparisons and reporting via SotB, and revisited as additional data sets become available
1.3.b Provide State of the Bays reporting at multiple scales	Establish a recurring reporting cycle for each MassBays region Host/participate in forums, conferences, and meetings to share results Provide Bays-wide analysis and interpretation to identify common issues	ongoing	RSPs (regional analysis & outreach) Resource managers, regulatory agencies (target audiences)	Slide decks, posters, and other presentation materials regarding status and trends Bays-wide SotB Symposia or publications (2020, 2025) include both cross-region and region-specific information and needs By 2025, SotB reporting incorporates data relevant to underserved communities as requested by those communities through the Regional Service Providers (see Actions 1.1.a and 2.3.b). By 2023, MassBays is providing data analysis and reporting not available elsewhere
1.3.c Provide online access to State of the Bays reporting	Establish ecoreport card for the Bays that ultimately reports on conditions in individual assessment areas Announce availability and disseminate findings broadly Engage local decisionmakers according to a strategic communications plan	2021 and ongoing	UMCES/IAN (report card development and hosting)	By 2021, launch online ecoreport card available via a link from massbays.org By 2021, Trends data for core water quality parameters are incorporated into online ecoreport card, and easily accessed by stakeholders and decision makers

Goal 2. MassBays reaches all planning-area municipalities with actionable information about coastal habitats				
Strategy 2.1 Support, conduct, and disseminate research regarding ecosystem functions to inform state policy and local action				
Action	**Activities**	**year(s)**	**partners (roles)**	**measures/outputs**
2.1.a Identify, evaluate, and support research regarding effectiveness of conservation & restoration activities	Fund, and disseminate findings of, Healthy Estuaries Grant Program Maintain practical, applied-research orientation of grant awards	2020, 2022, 2024, 2026, 2028	resource managers, researchers, STAC (prioritization), LGCs, MC (id needs)	Each year, allocate at least 5% of MassBays annual budget to small-grant program, distributed on an 18- to 24-month schedule All funded projects document policy/resource management outcomes
2.1.b Test and implement innovative monitoring (including rapid field assessments) and restoration approaches	Provide opportunities for partnerships on program pilots and demonstrations Support research and development of monitoring methods for emergent contaminants Evaluate suitability of approaches used elsewhere for MassBays planning areas Participate in and host blitzes, data challenges	ongoing	state & federal agency scientists, academic & research institutions, citizen scientists, ngos, marine tech business and consultants (collaborators)	Quarterly reports from RSPs on activities under this Action An Annual Report including highlights describing work under this Action In both 2023 and 2028, MassBays' PE documents evidence for an "exceeds" ranking on this action.
2.1.c Support cross-sector information sharing	Disseminate and promote successes, share challenges, promote transferability	ongoing; 2020, 2022, 2025, 2027	Healthy Estuaries grantees, STAC, RARGOM, MOTN, NERACOOS, GOMC (audience-participants)	Meetings of researchers working in MassBays (e.g., Healthy Estuaries recipients) in 2020, 2022, 2025, 2027 MassBays' sponsorship and/or engagement is acknowledged by partners in online and printed reports and other materials

Strategy 2.2 Provide education, training, and technical support; share case studies (successful and not); and support collaboration and cooperation on specific topics				
Action	**Activities**	**year(s)**	**partners (roles)**	**measures/outputs**
2.2.a Revise and disseminate existing, effective education and outreach materials, and develop new materials and outreach efforts, providing context and integrating multiple sources	Determine audiences for different products Survey municipal needs Compile case studies, challenges, and solutions for use by municipal staff Identify existing and potential networks in each region for reciprocal communications (e.g., sharing announcements and materials) Present findings at conferences, etc. Include materials on website, etc. per communications plan Frame messages with references to benefits -- ecosystem services, etc. Emphasize the connection of habitat to natural/wild places, biodiversity Assist development and dissemination of CZM MyCoast and StormSmart materials	ongoing	municipal staff, residents (audiences); CZM, watershed associations, MEMA, MIT Sea Grant and EPA social scientists (content resources) NEOSEC (E&O)	Each year, at least 30 of the 50 towns in MassBays' planning area are significantly engaged, as grant partners/recipients, e.g., by implementing restoration or retrofitting for stormwater management, or engaging in joint education and outreach efforts. By 2022, increase MassBays' capacity for communications and outreach by 0.5FTE/y By 2028, Update/revise/contextualize and disseminate five education and outreach products to reach target audiences By 2028, establish estuary-focused subgroup within NEOSEC
2.2.b Engage with local decisionmakers and residents for habitat protection and restoration to mitigate impacts of increased freshwater inputs, sea level rise, and storm surges , including promoting nature-based approaches	Convene regional meetings; support regional approaches Assist with grant proposals for local resilience and municipal vulnerability assessments, bringing ecosystem concerns to the table. Identify resources for mitigation, especially where co-benefits are possible Collaborate with and provide technical assistance to neighborhoods, municipal staff, boards, and commissions	ongoing	CZM (science content); TNC, MLTC, TTOR, Mass Audubon (education content & sites); Local ngos (engagement efforts)	Each year, RSPs assist on at least two funding proposals (e.g., Letter of Support, proposal review) Each year, document four cases in which MassBays has influenced local decision making (e.g., serving on an advisory group or other decision making body, submitting comment letters)
2.2.c Communicate about climate change impacts and vulnerabilities at the local level	Develop and implement communications plan to disseminate information Conduct education re: marsh migration, shoreline change & etc. Highlight "green" activities happening locally	2020 & ongoing	CZM, NEAq, NEOSEC, NPS, TTOR, TNC, MassAudubon (education content, sites)	By 2022, produce communications plan to include climate change outreach aligned with and complementary to other agencies' efforts In each SotB report (Action 1.3), include case studies

Strategy 2.3 Provide access to, and increase influence on decisionmaking by underserved communities				
Action	**Activities**	**year(s)**	**partners (roles)**	**measures/outputs**
2.3.a Review and adjust Management Committee composition to ensure diverse, representative input to MassBays' planning	Revisit MassBays' Structure and Operating Procedures to assess Management Committee roster Identify gaps in representation Ensure representation of diversity in Subcommittees Add underserved/underrepresented neighborhoods data layer to EDA	2019 - 2021	MC Nominating and Governance Subcommittee, EEA, EPA EJ and Urban Waters offices (advise)	By 2020, Management Committee SOPs reviewed and revised as needed By 2020, Subcommittee membership is diversified with active engagement of new representatives from public health, business, technology, formal and informal education, and other sectors By 2022, incorporate a data layer into EDA 3.0 documenting regional disparities in adverse impacts/benefits.
2.3.b Engage partners who work with underserved communities in MassBays' regions	Evaluate representation of underserved/underrepresented groups on LGCs Ensure that events are accessible to underserved/underrepresented community representatives Offer and support direct access to decisionmakers Facilitate cross-Bays sharing of tools and contacts for engagement	ongoing	EPA EJ & Urban Waters programs, local EJ organizations (evaluation); RPAs, MMA, RSPs (connections to decisionmakers)	Each year, document measures taken to support diverse community access to meetings, events, and decisionmakers Each year, MassBays attributes action on at least one initiative to requests, or programs identified or selected for action, by underserved communities. Each year, representatives of groups based in underserved communities regularly engage in activities at the regional level. In 2023, representatives of underserved/ underrepresented communities will report on MassBays' engagement as part of the EPA Program Evaluation

Goal 3. MassBays provides regular and locally informed State of the Bays reporting that reflects the unique characteristics of MassBays assessment units (embayments, rocky shore, barrier beach), and documents progress toward target conditions				
Strategy 3.1 Establish target (improved) water quality and habitat conditions for each embayment tied to desired uses and ecosystem services				
Action	**Activities**	**year(s)**	**partners, roles**	**measures/outputs**
3.1.a Identify indicators and metrics to describe diversity and similarities among embayments, rocky shore, beaches and dunes across MassBays' planning area	Refine the Biological Condition Gradient and Final Ecosystem Goods and Services analyses via EDA updates, and using data from monitoring programs under the framework to inform BCG/FEGS and targets Consider new data sets, emerging issues & contaminants, and social science/economic valuation measures Incorporate climate change metrics and indicators	2020, 2021, 2024, 2027	EPA ORD and OST, Northeastern University, STAC (methodology and guidance) ISMN, RARGOM, NERR, MIT Sea Grant (input to metrics, target-setting)	By end of 2020, produce and disseminate a public document describing process used to categorize embayments In 2021, 2024, and 2027, extract relevant data from EDA to refine targets MassBays' BCG targets continue to be relevant in out-years.
3.1.b Identify target conditions to guide management and restoration decisions	Establish targets for management conditions through a Biological Condition Gradient process: convene expert panel(s), etc. Inventory and assess historical data re: habitat presence/absence and condition Determine measures to monitor progress toward targets	2019 - 2021	STAC, EPA ORD and OST (methodology and guidance) UHI, ISMN, RARGOM, NERR, Sea Grant (input to metrics, target-setting)	By 2019, inventory and extract historical data for incorporation into BCG By 2021, incorporate targets into Bays-wide and regional annual workplans using measures as identified

Strategy 3.2 Guide local action to expand habitat and improve water quality according to targets				
Action	**Activities**	**year(s)**	**partners (roles)**	**measures/outputs**
3.2.a Develop and implement action plans according to targets	Evaluate feasibility of actions to meet target conditions, including funding and support from local, state, and federal decisionmakers	ongoing	RSPs, LGCs, MC	Annual Bays-wide workplans identify interim objectives toward implementation of CCMP goals MassBays' annual workplan incorporates priorities of local stakeholders, based on progress toward target conditions
3.2.b Promote activities to improve and protect estuarine values and resources	Evaluate restoration efforts' success Prioritize habitat conservation and restoration projects based on regional needs assessments Encourage and support post-restoration monitoring for at least 5 years Work with local groups to develop action plans to address adverse environmental impacts of CSOs, stormwater, and other discharges Expand efforts to disseminate findings, share successes and challenges	2020 and ongoing	NOAA, DER, DMF (restoration funding and implementation) municipal officials and staff (priority-setting)	Quarterly reports on activities provided to MC Restoration efforts are based on regional prioritization for action
3.2.c Measure and report on progress toward targets	Implement monitoring framework (see Goal 1 strategies above) Submit NEPORT data to EPA Maintain ecoreport card	2021 and ongoing	DEP, DMF, EPA, MWRA, ngo monitoring groups (data); UMCES/IAN (report card hosting)	Annual regional workplans include targets and reports on progress toward targets, based on local data sets as available Beginning in 2023, biennial updates to ecoreport card document progress toward targets

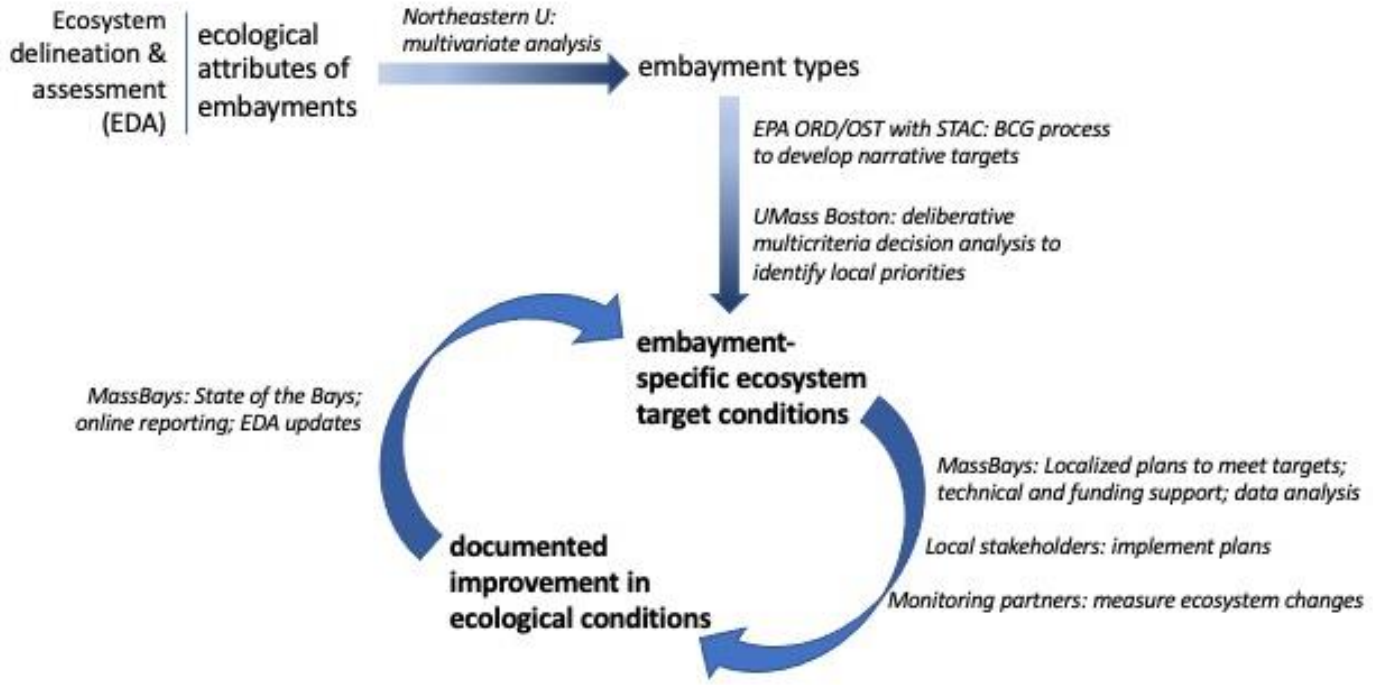
Strategy 3.3 Maintain MassBays' National Estuary Program status				
Action	**Activities**	**year(s)**	**partners (roles)**	**measures/outputs**
3.3.a Conduct evaluation of organizational and programmatic impact	Develop, implement, and evaluate impact of communications activities based on the Strategic Communications Assessment and Recommendations Suffer EPA performance evaluation	PE 2023, 2028; Comm eval 2025, 2029	grantees, RSPs (reporting) Communications Subcommittee (advice)	Each year, document local support of MassBays programming and initiatives from agency, nonprofit, individual, and research community in each region Each year, S.320 funding granted to MassBays should be equal to other NEPs' base funding allocation MassBays receives findings of "Pass" from the PE process
Establish and support collaborative efforts in MassBays' regions that increase opportunities to leverage new resources	Create and maintain partner lists Support region-specific partnerships with academic and business/technology communities Coordinate grant proposals and meetings among diverse and nontraditional partners, within and across regions	ongoing	RSPs (convening, reporting)	Between 2019 and 2023, document (and report via NEPORT) 25% increase in average leveraged resources; between 2024 and 2028 document 50% increase in average leveraged resources, compared to 2012-2017 5-year average of $6 leveraged per §320 dollar. Each year, set and meet targets for engagement with the business/technology sector at the regional level Each year, prepare at least one multi-partner proposal for funding from entities other than EPA

2020-2021 Proposed Work

Foremost in our plans for the coming year is to implement Strategy 3.1, *Establish target (improved) water quality and habitat conditions for each embayment tied to desired uses and ecosystem services*. Meeting this objective is key to our desire to provide more robust and localized State of the Bays reporting. Figure 1 provides an overview of the components of this State of the Bays effort; work is ongoing

Of course, project-based work to improve conditions, collect data, and support partners' efforts will be ongoing. Specific proposed region-wide and sub-regional tasks are described in ***Section C, New and Ongoing Projects***.

Figure 1. *MassBays' State of the Bays reporting has been limited due to the scarcity of planning area-wide data. CCMP Goal 3 is focused on improving our ability to generate comprehensive reporting that is tied to desired conditions. The process flowchart below describes how MassBays is convening expert and stakeholder partners to devise ecosystem targets, generate reporting tools, and inform local action. This cycle will inform adaptive management to be implemented through yearly workplans.*



Staffing and Management

MassBays' Management Committee sets priorities for the program, and fosters partnerships for diverse engagement in our work. Committee members for the period July 1, 2019 through June 30, 2020 are listed in Attachment A.

Massachusetts Coastal Zone Management hosts MassBays (and Buzzards Bay NEP as well), providing in-kind technical and administrative support to MassBays. Fiscal management, GIS services, IT and HR support, and scientific expertise. In addition, access to photocopiers and printers, computers and software, and internet and phone services are provided.

Executive Director Pam DiBona is responsible for the overall management of the program, including reports to EPA and other funders; staff supervision, including oversight of Regional Service Providers in line with contracts; and organizational development, including strategic planning and funding planning to implement the CCMP. She also produces outreach materials, including three MassBays e-newsletters.

Staff Scientist Prassede Vella works 60 percent of her time with MassBays and 40 percent of her time with our host agency, CZM, as an Ocean Management Specialist. For MassBays, Prassede is responsible for coordination of the Healthy Estuaries Grant Program, staffs the Science and Technical Advisory Subcommittee to our Management Committee, and serves as technical expert for MassBays monitoring and reporting efforts.

Monitoring Program Circuit Rider Jill Carr works half-time with funding from EPA's Exchange Network Grant to provide hands-on, one-on-one technical assistance to community-based monitoring groups across the MassBays planning area. Her work advances our efforts to obtain new monitoring data to inform our State of the Bays reporting and prompt local action.

Regional Service Providers (RSPs) connect MassBays with planning area communities organized under five regions: Upper North Shore, Lower North Shore, Metro Boston, South Shore, and Cape Cod. Under cooperative grants from MassBays, each RSP designates a Regional Coordinator, in turn responsible for identifying regional priorities consistent with the outcomes articulated in the CCMP, and implementing an annual workplan at the local level. For FFY2020, the following organizations will serve in this capacity:

- Merrimack Valley Planning Commission (MVPC)/MassBays Upper North Shore Region
- Salem Sound Coastwatch (SSCW)/MassBays Lower North Shore Region
- Northeastern University Marine Science Center (NUMSC)/MassBays Metro Boston Region
- North and South Rivers Watershed Association (NSRWA)/MassBays South Shore Region
- Association to Preserve Cape Cod (APCC)/MassBays Cape Cod Region

FFY2020 Budget Overview

A detailed budget request and narrative are included in ***Section D***; a summary is included here:

Salary & fringe	$ 229,533
Travel	$ 1,249
Contractual	$ 15,000
Other	$ 396,617
Indirect	$ 20,101
Total Request	**$ 662,500**

B. Completed Major Projects and Activities (July 1, 2019 to June 30, 2020)

MassBays' Workplan for Federal Fiscal Year 2019 was the first implementation workplan for MassBays' new CCMP, and actions for the year were driven by the following Goals and Strategies:

Goal 1. MassBays provides new resources to support research and management in the Bays.
Strategy 1.1 Address data gaps
Strategy 1.2 Support valid (QA/QC) data collection and use

Goal 2. MassBays reaches all planning-area municipalities with actionable information about coastal habitats
Strategy 2.1 Support research to inform policy and actions
Strategy 2.2 Technical support and communications
Strategy 2.3 Increase influence of underserved communities on decision making

Goal 3. MassBays provides regular and locally informed State of the Bays reporting that reflects the unique characteristics of MassBays assessment units (embayments, rocky shore, barrier beach), and documents progress toward target conditions.
Strategy 3.1 Establish target conditions
Strategy 3.2 Guide local action for expanded habitat and improved water quality

Through implementation of these strategies, MassBays anticipates achieving the following Outcomes:

- Sustainable NEP
- Improved habitat continuity and restored hydrology
- Improved water quality
- Resilient coastal habitat, including nature-based coastal protection
- Restored natural communities
- Robust interagency and interdisciplinary collaboration and partnerships
- Well-informed, multisector input to decision making which includes underserved communities

Our work is closely aligned with the Clean Water Act Core Programs, which are:
(1) establishing water quality standards
(2) identifying polluted waters and developing plans to restore them (total maximum daily loads)
(3) permitting discharges of pollutants from point sources (National Pollutant Discharge Elimination System permits)
(4) addressing diffuse, nonpoint sources of pollution
(5) protecting wetlands
(6) protecting coastal waters through the National Estuary Program
(7) protecting Large Aquatic Ecosystems.

The following list of accomplishments is organized according to the CCMP Strategies included in our 2019 Draft CCMP completed by June 30, 2020.

Each project description includes the following:

Title
CWA core program: Per list (1-7) above
Objective: project-specific objective
Partners: Collaborators not directly funded by MassBays/§320 funds
Status: as of June 2020
Accomplishments and Deliverables: completed products

Strategy 1.1 Address data gaps

Title	**Implement MassBays Monitoring Plan (Central Staff)**
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	Compile data sets for MassBays' delineated embayments, toward the goal of comprehensive and specific State of the Bays reporting.
Partners	STAC, RCs, Monitoring Working Group, DEP
Status	This task implements the MassBays Monitoring Framework.
Accomplishments and deliverables	
Design and launch a MA Coastal Condition Assessment (MCCA) (2020-2023)	Developed ISA and scope of work between MassBays and DEP for MassBays (Appendix B) to manage a 2020-2013 Marine Survey under CWA S.109. Developed Field Operations Manual and associated materials, and QAPP (under review). Contracted with Normandeau Associates for the field work and with certified labs (through Normandeau) for the sample analyses.

Title	**Investigate nutrients in Salem Sound (Central Staff, Lower North Shore)**
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	Design a monitoring plan for water quality across the Sound that includes baseline monitoring as well as identification of hot spots.
Partners	SeaTrac Systems Inc, CZM, SSU, ACASAK Technologies, CCS
Status	MassBays and LNS RC worked with local stakeholders to formulate questions and design monitoring to generate quality data sets (2019); the data are currently being analyzed for baseline data for salinity, temperature, DO, pH, turbidity and nutrients. SSU will conduct isotopic analysis. Funding from EPA's Multipurpose Grant Program has been secured to build on this work as MassBays and CZM team up to gather more water quality data as well as start investigating the benthic communities of Salem Sound.
Accomplishments and deliverables	
Developed and implemented monitoring plan	Conducted monitoring according to an approved QAPP in Danvers River and Salem Sound between July and September 2019. Gathered new baseline data for nutrients in Salem Sound using discrete sampling as well as an autonomous vessel to survey conditions near outfalls with continuous, real-time data (Attachment C).
Secured additional funding for further investigations Salem Sound	Developed successful proposal for funding to expand monitoring in Salem Sound in 2020. Developed scope and QAPP to conduct nutrient monitoring and benthic monitoring. These data, together with 2019 data, will start to address EPA's and DEP's questions on nutrient conditions in Salem Sound and inform management decisions on mitigating these impacts.

Title	**Monitor Cyanobacteria blooms (Cape Cod)**
CWA Core Program	Protecting coastal waters through the National Estuary Program; Identifying polluted waters and developing plans to restore them
Objective	Collect actionable information on harmful cyanobacteria blooms for the public and decisionmakers.
Partners	EPA, towns of Brewster, Chatham, Barnstable, Dennis, Yarmouth, MA Department of Public Health, MA DEP, Nancy Leland
Status	Of the more than 30 ponds monitored, most experienced cyanobacteria blooms, while several experienced severe blooms. Concurrent research on juvenile river herring-cyanobacteria food web relationships indicated that by mid-July 2019 juvenile herring were feeding almost exclusively on cyanobacteria while the herring appeared healthy themselves. This raises questions about potential trophic transfer of cyanotoxins, availability of juvenile herring preferred food (zooplankton) and other questions that could bear on herring health and food web effects. APCC remains concerned about potential transfer of cyanobacteria or cyanotoxins from freshwater ponds to estuaries.
Accomplishments and deliverables	
2019 Report on monitoring and findings	Monitoring procedures were included in a draft QAPP, and monitoring implemented. Findings for 2019 were posted at APCC's interactive online map at https://www.apcc.org/cyano/index.html. (The map has been cleared of 2019 results in preparation for 2020 monitoring.)

Title	**Horseshoe Crab Spawning Surveys (South Shore)**
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	Conduct horseshoe crab spawning surveys in Duxbury Bay to assess the population
Partners	DMF, volunteers
Status	2019 data were submitted, 2020 surveys are on hold due to coronavirus concerns.
Accomplishments and deliverables	
2019 field work	Data for the 2019 season were submitted to DMF.

Title	**Long-term Monitoring of Salt Marsh Vegetation Change (South Shore)**
CWA Core Program	Protecting wetlands
Objective	Work with volunteers to monitor salt marsh vegetation changes through the Salt Marsh Sentinels program.
Partners	Private dock owners, MET (funding), volunteers
Status	2019 data compiled and provided in a report to MET (Attachment D).
Accomplishments and deliverables	
Proposal submitted	Seeking funding for drone photography of the area.

Title	**Marsh Edge Erosion Monitoring (Upper North Shore)**
CWA Core Programs	Protecting wetlands
Objective	Determine the erosion/deposition status of marsh band and marsh edge in selected creeks and rivers of Plum Island Sound
Partners	BU
Status	Fifth year of monitoring completed.
Accomplishments and deliverables	
Erosion monitoring conducted	Annual monitoring of selected location Marsh Edge Erosion sites throughout Essex Bay (6 sites), Plum Island Sound (6 sites), and Merrimack River (3 sites) was begun. Parameters measured include; the distance to edge change, type of bank face and height, structure of bank face and marsh peat integrity.

Title	**Monitor Diadromous Fish Runs (South Shore, Cape Cod)**
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	Provide local, state and federal fisheries managers with population estimates of river herring at monitored runs to inform protection, restoration and management efforts. Monitoring by volunteers also supports citizen stewardship of runs.
Partners	DMF, NOAA Fisheries, Herring River Network, citizen volunteers
Status	Data submitted for 2019 runs; 2020 counting efforts on the South Shore were adjusted to adapt to coronavirus concerns and restrictions on gatherings. While the Cape Cod RC was prepared to provide in-person training, the timing of a stay-at-home mandate required cancellation of the trainings.

Accomplishments and deliverables	
2019 Herring run results reported (SS, CC)	Results shared with volunteers and organizational members via newsletters and a presentation to the River Herring Network; data submitted to DMF.
Technology tapped to assist 2020 SS monitoring efforts	South Shore volunteers used an app to submit data, the RC installed temperature dataloggers to replace hand-held thermometers, and in some locations used streaming video for counting. DMF assisted with installation of a camera in the South River.
Synthesis report for 2007-2019 Cape Cod runs completed (Appendix E)	Analysis of herring run size results from 2007-2019 indicates that, with the exception of several restored runs (e.g., Stony Brook, Pilgrim Lake), most runs continue to be at historically low levels compared to pre-2006 levels. In the past several years, some runs have decreased to very low levels, including several on Cape Cod Bay. The reasons are not clear, but could include poor water quality in spawning areas or other causes (these herring runs are maintained in excellent condition, according to DMF). Larger runs on the Nantucket Sound side of the Cape (outside of MassBays' planning area) tend to be faring better than smaller runs on the Cape Cod Bay side.

Title	**Marine Invasive Species Monitoring (Upper North Shore, Lower North Shore, South Shore)**
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	Monitor established field sites for non-native species in cooperation with CZM
Partners	CZM, volunteers
Status	Monthly monitoring conducted June-October, 2019; data submitted to CZM
Accomplishments and deliverables	
Monitoring sites across MassBays' planning area	Volunteers recruited and trained to conduct monitoring at 8 sites in LNS, 6 sites in UNS, and sites in SS.
Participated in 2019 Rapid Assessment Survey	SS RC participated in regional survey in southeastern MA, RI, CT, NY

Title	**Investigate Eelgrass Conditions in Duxbury-Kingston-Plymouth Bays (Central Staff, South Shore)**
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	Implement a rapid assessment protocol to monitoring eelgrass extent and condition in Duxbury-Kingston-Plymouth Bays.
Partners	DMF, volunteers
Status	A second successful season of eelgrass surveys was completed in 2019.

Accomplishments and deliverables	
Volunteers recruited and trained	In 2018 MassBays had to rely heavily on MassDMF despite it being a citizen science project, but in 2019 we were able to recruit citizen volunteers and boat captains and conduct the surveys mostly independently.
Status report completed	Technical report describing findings and including data (Appendix F).

Title	**Water quality monitoring (South Shore, Lower North Shore)**
CWA Core Program	Protecting coastal waters through the National Estuary Program; Identifying polluted waters and developing plans to restore them
Objective	Lead citizen monitoring in coastal waters to identify potential for remediation and source control.
Partners	EPA, MassDEP, municipalities
Status	2019 field season was successful; 2020 monitoring will be constrained by restrictions due to the coronavirus.

Accomplishments and deliverables	
Riverwatch monitoring (SS)	Scope of 2019 monitoring was expanded to the headwaters of the North River.
Duxbury/Kingston/ Plymouth Bay monitoring (SS)	With an approved QAPP in hand, monitoring in the Bay has gained support from the Duxbury Bay Maritime School and Duxbury Bay Management Commission as well as the Center for Coastal Studies. The project will shadow and parallel the Center for Coastal Studies' work in the area for 2020.
Clean Beaches & Streams and tributary monitoring (LNS)	Report and results were published on SSCW website, submitted to DEP, and uploaded to EPA's WQX data portal. An updated QAPP was prepared for the 2019 field season and updated for 2020.

Title	**Mussel Bed Water Quality Monitoring (Upper North Shore)**
CWA Core Programs	Protecting coastal waters through the National Estuary Program
Objective	Determine water quality parameters at existing mussel beds to assess quality conditions necessary for mussel bed and mussel reef development
Partners	DMF
Status	DMF is analyzing data collected during 2019.

Accomplishments and deliverables	
Monitoring equipment deployed; data collected for analysis	Water quality monitoring equipment (pH, DO, Conductivity, light/temp) deployed in conjunction with MA Division of Marine Fisheries at two know mussel bed locations; Conomo Point, Essex and Pavilion Beach, Ipswich.
Equipment in hand for 2020 investigations	Replacement monitoring equipment components and a third set of equipment has been purchased by MVPC for spring installation at potential sites to determine water quality similar to that of health mussel beds.

Title	**Assess Coastal Acidification in Massachusetts (South Shore, Central Staff, Lower North Shore)**
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	Assess coastal acidification conditions in Duxbury Bay and Salem Sound.
Partners	EPA, NERACOOS, NECAN, GMRI, UMB, Town of Duxbury, volunteers, Seaside Sustainability
Status	MassBays continues to support and participate in NECAN activities. Staff Scientist continued to work with UMass Boston to get the coastal acidification observing system deployed in Duxbury Harbor. LNS RC continued monitoring of pH in 3 mudflats with volunteers.
Accomplishments and deliverables	
Ocean acidification monitoring system developed and deployed in Duxbury Harbor	Parts of the system were installed and tested in winter weather conditions. The system was deployed briefly for testing in March 2020. Following some adjustments and replacement of the thermosalinograph the system will be deployed by June 30.
Participated in NEP Coastal Acidification Network (CS)	Staff Scientist contributed to the report on coastal acidification currently being prepared by EPA.
Joined and supported the MA Ocean Acidification Commission (SS, LNS, CS)	South Shore RC was appointed to the Commonwealth's Ocean Acidification Commission established by the Massachusetts legislature in September 2018. Two meetings (December 2019 & February 2020) were held. Staff Scientist worked with CZM to compile information on existing information/data and planned monitoring in MA for the Commission. LNS RC presented to the Commission at their February 7th meeting at Salem State University on the "Causes of Ocean Acidification, the State of the Science and how Citizen Science Volunteers and Regional Non-Profits Can Help Gather Data ."
Conduct monitoring at least three mudflats (LNS)	Volunteers collected pore water for analysis.
Participated in NE "Shell Day" (LNS)	This single-day monitoring event along the coast from Long Island Sound to Downeast Maine examined the relationship between salinity and alkalinity. Volunteers across coastal New England took temperature, salinity, and pH measurements and collected water samples at low, mid, and high tides. Collaborating laboratories analyzed the collected water samples to determine the total alkalinity. If salinity and total alkalinity correlate enough for salinity to be used as a proxy for alkalinity, salinity measurements could be used to help estimate carbonate saturation state and local vulnerability to acidification.

Strategy 1.2 Support valid (QA/QC) data collection and use

Title	**Complete MassBays Monitoring Framework and CCMP**
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	Complete the framework to guide implementation of the CCMP for MassBays' planning area; finalize CCMP according to EPA comments.
Partners	EPA Region 1, STAC, MC
Status	Framework attached to draft CCMP; Implementation of Strategy 3.1 underway to meet EPA concerns.
Accomplishments and deliverables	
Monitoring Framework finalized	The Monitoring Framework describing MassBays' approach to integrate and use data from existing programs was finalized and will be an integral component of CCMP implementation.
Responses to EPA HQ questions provided	The ED took part in conference calls with EPA HQ staff to describe the program climate vulnerability assessment and target-setting process.

Title	**Support for Citizen Science Monitoring Efforts**
CWA Core Program	Identifying polluted waters and developing plans to restore them
Objective	Increase the value and use of citizen monitoring data for decision making across the region.
Partners	Monitoring Coordinators Network, CSA Data Quality and Metadata Working Group, Massachusetts Rivers Alliance, DEP, EPA Exchange Network Program, EPA Region 1, Eastern Research Group, UMCES-IAN
Status	MassBays is applying S.320 funding to incorporate specific changes in preparation for the final version of AquaQAPP to be made available online. One-on-one assistance to groups continues via Zoom and webinars.
Accomplishments and deliverables	
Beta testing of AquaQAPP completed	MassBays worked with the Rivers Alliance to convene monitoring groups with differing expertise and capacity to beta-test the AquaQAPP application. ERG compiled ten page summary of feedback from the 11 organizations attending, as well as EPA and DEP representatives. The requests were prioritized in consultation with MassBays, and bugs addressed and fixes completed by March 31 2020. A list of desired upgrades has been developed and costed out.
Circuit Rider on staff and providing assistance	MassBays' new part-time staff person, funded through a grant from EPA's Exchange Network, started work in November 2019. She has met one-on-one with 16 watershed groups to gauge their capacity and provide assistance. Services included help with data analysis and sharing (see this example Story Map: http://bit.ly.2Y6s1cI), sampling plan design and QAPPs, outreach and training (including developing resources for training and field work during the pandemic), and data management.

WQX data submission templates drafted	MassBays developed "friendlier" versions of existing WQX templates to facilitate use by community-based groups. The templates have been shared with several groups for testing regarding their ease of use and relevance to basic monitoring protocols and project designs.
Data Quality Resource Compendium published	MassBays co-led an effort through the Citizen Science Association (www.citizenscience.org) to compile a new resource, "Data Quality Resources for Citizen and Community Science," (https://bit.ly/2WyJ2xa), a compendium of resources for monitoring program coordinators, project leads, and volunteer trainers. Each entry provides a link to the resource, information about the authors and intended audience, and which aspects of the data management cycle are addressed. The compendium is the first step in a project to identify gaps and needs for additional resources to support citizen science programs.

Strategy 2.1 Support, conduct, and disseminate research regarding ecosystem functions to inform state policy and local action

Title	**2020 Healthy Estuaries Grant Program**
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	Improve understanding and extent of data available across MassBays' planning area.
Partners	EPA, MOP, SSU, IRWA, MyRWA, TTOR, others pending award announcement
Status	Five projects were completed during FFY2019 , and a new round of funding was announced in March 2020. Fifteen pre-proposals were received of which nine were invited to submit a full proposal. Four projects were selected for funding (total $95,000).
Accomplishments and deliverables	
Closed out 2018-2020 grants	Five projects were completed and technical reports and recommendations have been submitted. Final reports are available as of June 30, 2020 on MassBays' website (https://www.mass.gov/service-details/projects-funded-by-massbays-grant-programs).
Pre- and full proposals reviewed	Fifteen pre-proposals were submitted; nine full proposals were invited. Recommendations for funding were forwarded to EEA in June. These projects will be implemented between July 2020 and December 2021.

Title	**Dam Removal Implementation and Monitoring (South Shore)**
CWA Core Programs	Protecting coastal waters through the National Estuary Program
Objective	Work with regional communities and other partners to assess feasibility and seek funding for removal of dams and other barriers and collect ecological data pre- and post-restoration
Partners	NOAA Fisheries, DER, Town of Marshfield, Town of Duxbury: dam removal project technical assistance and management
Status	Progress has been made on all three dam removals, as described below.
Accomplishments and deliverables	
Peterson Pond Dam	Slated to be removed by the end of 2020, with the final piece of funding being applied for now from the NOAA Community Restoration program.
Temple Street Dam and Veterans Memorial Park Dam (South River)	Temple Street Dam is currently about to have a hydrology study conducted to understand the effects of the dam removal on downstream infrastructure and also prepare for feasibility. Veterans Memorial Park Dam just completed 40% design and funding is going to be sought for final design and permitting.

Strategy 2.2 Provide education, training, and technical support; share case studies (successful and not); and support collaboration and cooperation on specific topics

Title	**Presentations & Publications**
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	Increase awareness of MassBays' natural, educational/technical, and information resources.
Partners	Local nonprofits, municipalities, researchers, regional planners, high school students, interested lay audiences.
Status	All listed below were completed as of June 30, 2020.
Accomplishments and deliverables	
Central Staff outputs	*Presentations:* *The Past and Future of Boston Harbor* (8/28/19) presented at UMass Boston's Graduate Student Bootcamp for School of the Environment. *Community outreach and priority-setting for MassBays' CCMP* (9/19/19) presented to the Management Committee and STAC of the Narragansett Bay NEP. *"Water Quality Monitoring Using an Autonomous Vehicle*" (10/2/19) presented during the 2019 NEP Tech-Transfer Meeting in Delaware. *Intersections between citizen science and government policymaking* (11/19/19) presented to an undergraduate class at Brandeis University. *"AquaQAPP beta-testing"* (11/20/19) The AquaQAPP tool was demonstrated and workshop participants practiced QAPP generation with real-time technical support. Feedback on tool functionality and usability was provided and incorporated into revisions. *MassBays CCMP and the Healthy Estuaries Grant Program* (11/21/19) presented at the Ipswich River Watershed Association's unveiling of their Great Marsh Barriers Restoration Assessment. *"Introducing the Duxbury Bay eelgrass blitz*" (1/15/20) presented during the MassBays Management Committee meeting. *Opportunities for NEP-Research Lab Collaborations* (3/19/20) presented to the National Association of Marine Laboratories. "*Water Quality Exchange (WQX) Data Framework Beginner's Training"* (3/31/20) MassBays and EPA demonstrated EPA's Water Quality Exchange (WQX) data framework and provide training to dozens of Massachusetts citizen-based monitoring programs on creating an account, formatting data, submitting data, and more. *"Citizen-Based Aquatic Field Sampling in the Time of COVID" (4/21/20)* MassBays and UVM hosted a "brainstorm" session for watershed groups to discover and share best practices for field work during the COVID-19 outbreak. *ANEP priorities for 2020* (4/23/19) presented to a national gathering of coastal and ocean organizations. *Ask Me Anything: Introducing the Compendium of Data Quality Resources* (4/28/20) co-presented to CSA members. "*Eelgrass source site and planting season affect restoration success in Salem Sound, MA*" presented by co-author at EPA's Zosterapalooza (4/29/20) "*Emerging contaminants: Pharmaceuticals and Personal Care Products*" (6/10/20) MassBays and CZM provided an overview of

	Pharmaceuticals and Personal Care Products (PPCP) that may be detectable in our waters and the field protocols used in sampling. "*Emerging contaminants: PFAS*" (6/24/20) MassBays and CZM discussed the large group of chemicals known as Per- and Polyfluoroalkyl Substances (PFAS) that may be detectable in our waters and the field protocols used in sampling. *Publications:* Monitoring Coordinators' Network email newsletters and special editions published 11/13/19, 11/27/19, 2/19/20, 3/20/20, 4/27/20, 5/1/20, and 6/1/20. Logan, J., A. Boeri, J. Carr, T. Evans, E. Feeney, K. Ford, and K. Frew. "A review of the effects of small docks and floats on aquatic ecosystems and Best Management Practices for impact avoidance and minimization" (manuscript in review). Novak, A.B., Pelletier, M.C., Colarusso, P. Simpson J., Gutierrez, M.N., Arias-Ortiz, A., Charpentier, M., Macque, p., and P. Vella.. Factors Influencing Carbon Stocks and Accumulation Rates in Eelgrass Meadows Across New England, USA. *Estuaries and Coasts* (2020). https://doi.org/10.1007/s12237-020-00754-9
Upper North Shore outputs	*Presentations:* Essex Marsh Restoration Projects, Studio 1623, July 19, 2019 "Great Marsh Partnership Restoration Projects" presented at: • NEP Tech Transfer meeting, October 4, 2019 • Legislative Coastal Caucus, October 8, 2019 • Great Marsh Symposium, October 23, 2019 • Gulf of Maine Symposium, October 5, 2019 • Coastal Science Conference, November 19,2019 • MassAudubon – Joppa Flats, January 2020 • Middlebury College, May 8, 2020 (via Zoom) Novel Coastal Restoration Practices, Great Marsh, Tufts Urban and Environmental Policy Program, November 13, 2019 Dredge Acquisition Evaluation Study, Legislative Coastal Caucus Subcommittee, December 16, 2019 2019 Phragmites Management and Other Restoration Activities, Great Marsh Revitalization Task Force, December 20, 2019
Lower North Shore outputs	*Presentations:* "Salem's Lost River" 8/28/19. East Regiment Beer Co. Salem MA. "Climate Change: A Local Conversation" 9/30/19. Manchester Library, Manchester-by-the-Sea MA. "All about Lobsters and Our Changing World" 10/6/19. Sustainable Marblehead Children's Fall Fair, Marblehead MA. "Climate Change: A Local Conversation" 10/21/19. Danvers Senior Center Men's Club, Danvers MA. "Our Environment and Climate: How It's Changing" 11/7/19. Manchester Harbor Boat Club, Manchester-by-the-Sea MA. "Re-Imagining Salem – Climate Change: Mitigation & Adaptation" 1/27/20. City-wide Meeting. Salem MA.

	"Re-Imagining Salem – Coastal Resilience" 2/24/20. Focus group follow-up. Salem MA. "Coastal Ocean Acidification" 2/3/20. Massachusetts Special Legislative Commission Investigation and Study Relative to Ocean Acidification. Salem State University, Salem MA. "Mapping Future Flooding Risks for Coastal Communities: What will Marblehead Harbor Look Like in 2070? 2/3/20. Organized event with presentation by Kirk Bosma, Woods Hole Group. Marblehead MA. *Publications:* "Harnessing Nature's Designs - Learning How Nature Can Reduce Coastal Erosion." *Nature Massachusetts*. Fall 2019. The Nature Conservancy.
Metro Boston outputs	*Presentations:* "Local advantage within seagrass meadows" presented at Evolution 2019, annual meeting of Society for the Study of Evolution, American Society of Naturalists, and Society of Systematic Biologists (Providence, Rhode Islan June 2019) "Seagrass Genetic Diversity and Wasting Disease" workshop developed for Coastal Ocean Science Academy, a marine science summer day program for middle and high school students from local and underserved communities (Nahant, MA; August 2019) "Effects of fungal presence/absence on *Spartina* production and physiology" presented at 25th Biennial Coastal and Estuarine Research Federation Conference (Mobile, Alabama; November 2019) "Quantifying habitat restoration in the U.S." presented at 25th Biennial Coastal and Estuarine Research Federation Conference (Mobile, Alabama; November 2019) "Thank You, Ocean!" presented at NUMSC Science Café (Salem, MA; November 2019) "Oyster Doctors" activity presented at High School Marine Science Symposium for high school students from surrounding communities (Boston, MA; March 2020) "Local Advantage within Seagrass Meadows" presented at EPA's Zosterapalooza (Boston, MA; March 27, 2019) "Variation in flowering phenology across depths in Massachusetts eelgrass beds" presented at EPA's Zosterapalooza (Boston, MA; April 2020) *Publications:* Boston Harbor Ecosystem Network (BHEN) Email Newsletter published September 2019, October 2019, November 2019, December 2019, February 2020, and April 2020. Scyphers, S., M. W. Beck, K. Furman, J. Haner, A. G. Keeler, C. Landry, K. O'Donnell, B. Webb, and J. H. Grabowski. 2020. "Designing effective incentives for living shorelines as a habitat conservation strategy along residential coasts." *Conservation Letters* (in press). DeAngelis, B., A. Sutton-Grier, A. Colden, K. K. Arkema, C. J. Baillie, R. O. Bennett, J. Benoit, S. Blitch, A. Chatwin, A. Dausman, R. K. Gittman, H. S. Greening, J. Henkel, R. Houge, R. Howard, A. R. Hughes, J. Lowe,

	S. B. Scyphers, E. T. Sherwood, T. Shostik, S. Westby, and J. H. Grabowski. 2020. "Social factors key to landscape-scale coastal restoration: Lessons learned from three U.S. case studies." *Sustainability* (in press). Scyphers, S. B., M. W, Beck, K. L. Furman, J. Haner, L. I. Josephs, R. Lynskey, A. G. Keeler, C. E. Landry, S. P. Powers, B. M. Webb, and J. H. Grabowski. 2019. "A Waterfront view of coastal hazards: Contextualizing relationships among geographic exposure, shoreline type, and hazard concerns among coastal residents." *Sustainability* 11:6687. Gittman, R. K, C. J. Baillie, K. K. Arkema, R. O. Bennett, J. Benoit, S. Blitch, Julien Brun, A. Chatwin, A. Colden, A. Dausman, B. DeAngelis, N. Herold, J. Henkel, R. Houge, R. Howard, A. R. Hughes, S. B. Scyphers, T. Shostik, Ariana Sutton-Grier, and J. H. Grabowski. 2019. "Voluntary restoration: mitigation's silent partner in the quest to reverse coastal wetland loss in the USA." *Frontiers in Marine Science* 6:Article 511. Hughes, A. R., T. C. Hanley, J. E. Byers, J. H. Grabowski, T. McCrudden, M.F. Piehler, and D.L. Kimbro. 2019. "Genetic diversity and phenotypic variation within hatchery-produced oyster cohorts predict size and success in the field." *Ecological Applications* 29:e01940. Hughes, A.R., T.C. Hanley, A.F.P. Moore, C. Ramsay-Newton, R.A. Zerebecki, and E.E. Sotka. 2019. "Predicting the sensitivity of marine populations to rising temperatures." Frontiers in Ecology and the Environment 17:17-24.
South Shore outputs	*Presentations:* "Norwell Faces and Places Tour of the North River", Norwell Spotlight TV, July 2019 "Climate Change Teacher PD" South Shore Natural Science Center, July 2019 "The Role of Citizen Science in Gathering Coastal Ecological Data", Massasoit Community College, September 2019 "Keeping Fish Out of Hot Water! - How Science Leads to Protection", NSRWA Annual Meeting, November 2019 "MS4 Stormwater Permit Primer": • Norwell Selectboard, November 2019 • Scituate Selectboard, February 2020 "Dam Removal and River Restoration along Third Herring Brook" Ipswich River Watershed Association Barrier Removal Workshop, November 2019 "Using an Interagency Partnership to Develop Citizen-Based Eelgrass Monitoring", MassBays Management Committee (w/ Jill Carr and Prassede Vella), January 2020 Virtual Cocktail Hours with NSRWA • "Ale and Alewives" x 2, "Cocktails and Crabs" April 2020 • "Margaritas and Marshes", "Stouts and Stormwater" May 2020

	"Restoring a Living River: Past, Present, and Future of Dams on the Charles" Charles River Watershed Association online seminar (w/ Lisa Kumpf, CRWA Aquatic Scientist), May 2020 *Publications:* NSRWA E-News • 2019 River Herring Monitoring Report, July 2019 • National Estuaries Week, September 2019 • Duxbury/Kingston/Plymouth Eelgrass Blitz, September 2019 • Riverwatch 2019 Summary Report, October 2019 • MS4 Permit Primer, December 2019 • Headwaters Bacteria Sampling, December 2019 • Salt Marsh Sentinels, December 2019 • Coastal Acidification, February 2020
Cape Cod outputs	*Presentations:* "Volunteer Counts of River Herring: Why and How" presented to: • Dennis Herring Count Volunteers, March 2020; • Eastham Herring Monitors, March 2020; • Stony Brook Herring Monitors, April 2020; • Wellfleet Herring Monitors, March 2020; • Harwich Conservation Trust, March 2020; • Sandwich Herring Monitors, March 2020; • Tom Mathews Pond Herring Monitors (Bass River Rod & Gun Club), March 2020; • Mashpee Herring Monitors, March 2020. "Stony Brook Salt Marsh and Fish Passage Restoration, 2007 – 2013." Presentation by Steve Block and Jo Ann Muramoto, Ipswich River Watershed Association, November 2019. "Climate Change, Sea Level Rise and Cape Cod: What's Happening and What Can We Do About it?" Presentation by Jo Ann Muramoto to the Aptucxet Garden Club, Bourne, 11/18/19. "APCC's Climate Change Programs: Policy, Planning, Science and Implementation." Presentation by Jo Ann Muramoto to the Sippewissett Association, Falmouth, Summer 2019. "MassBays Regional Coordinator's Report" Presentation to the new Barnstable County Coastal Resources Subcommittee, 3/25/20. "State of the Waters" Presentation to the Compact of Cape Cod Conservation Trusts, March, 2020. *Publications:* Press Release, November 2019. "Results of 2019 Volunteer Herring Counts are a Troubling Mixed Bag." APCC Autumn 2019 Newsletter. Special issue on climate change. Posted at: https://www.apcc.org/newsletters/2019-Autumn.pdf Articles by Jo Ann Muramoto include impacts of sea level rise, impacts of climate change on water resources, and how climate change is fostering harmful cyanobacteria blooms. APCC's Winter 2019 newsletter on the State of the Waters: Cape Cod (see https://www.apcc.org/newsletters/2019-winter.pdf).

Title	Funding assistance – municipal program support
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	The Commonwealth of Massachusetts administers several grant programs with state funds related to MassBays goals. MassBays RCs assisted municipal partners in developing proposals for funding, providing letters of support and in-kind match, and implementation.
Partners	municipalities, local nonprofits, state agencies
Status	Support for the following applications was completed during FFY2019; those that were funded include the award amount.
Accomplishments and deliverables	
State Coastal Resiliency Grant Program (https://www.mass.gov/service-details/coastal-resilience-grant-program)	Salem Collins Cove Coastal Green Infrastructure FY2019 $270,625 Marblehead "Facilitating Climate Adaptation Strategies for Marblehead and its Harbor" ($93,545)
Coastal Pollutant Remediation Grant Program (https://www.mass.gov/service-details/coastal-pollutant-remediation-cpr-grant-program)	Winter Island Park LID BMPs CZM CPR grant FY2019 $160,813 Construct 2 rain gardens to capture, infiltrate to clean stormwater runoff
Massachusetts Municipal Vulnerability Preparedness (MVP) grant programs (https://www.mass.gov/municipal-vulnerability-preparedness-mvp-program)	Salem Sanitary Sewer Trunk Line Relocation Assessment, MVP Action Grant $431,250 Peabody North River Canal Resilient Wall, Riverwalk and Park MVP Action Grant FY2019 $224,216
Massachusetts Dams and Seawalls Grant Program (https://www.mass.gov/service-details/dam-and-seawall-repair-or-removal-program-grants-and-funds)	Columbus Avenue, Salem Seawall Replacement Project ($77,700) (Lower North Shore)

Title	Regional Conferences
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	Increase awareness of MassBays' natural, educational/technical, and information resources
Partners	CZM, DCR, NOAA, MVPC, APCC, NSRWA, SSCW, USGS, MVPC, CCC, CRC, CCS, TNC, Mass Audubon, BU, MBL, WHOI-Sea Grant, UNH, Parker River NWR, NWF, NU, municipal staff, WAA, SWIM, IRWA, WBNERR, DER, DEP, EPA Region 1, Cape Cod Chamber of Commerce
Status	Several hosting organizations determined that this year should be a reassessment year, choosing to reconfigure their outreach efforts to those other than a large conference. In addition, some were cancelled or postponed due to the coronavirus and concerns about public health. Specifics are provided below.

Accomplishments and deliverables	
Boston Harbor Ecosystem Network (BHEN) meetings and field trips (Metro Boston)	RC and BHEN steering committee organized three field trips to diverse sites: 1) Encore! Boston Harbor on September 18, which was attended by ~20 people and included a discussion of water transportation, as well as living shoreline and clean-up projects; 2) Massachusetts Water Resources Authority's (MWRA) Deer Island on October 15 for a tour of MWRA's wastewater treatment plant, which was attended by ~10 people; and 3) Belle Isle Marsh Reservation on October 29, which was attended by ~40 people and included a presentation by DCR's Sean Riley on the threatened saltmarsh sparrow, as well as a tour of the salt marsh at high tide, a discussion of climate change and salt marshes, and a collaboration with Museum of Science's David Sittenfeld, NUMSC's Francis Choi, and many other local groups and agencies to promote the use of MyCoast and SciStarter to document King Tide-associated flooding and raise awareness of coastal risks and vulnerabilities in and around Boston Harbor
Watershed Action Alliance Conference (South Shore)	RC participated in Watershed Action Alliance meetings. The Alliance planned a Legislative Breakfast which was to take place on March 28, 2020 in lieu of the regional conference; it was cancelled due to COVID-19 concerns.
Cape Coastal Conference (Cape Cod)	The 2019 Cape Coastal Conference was not held due to a staff vacancy at WBNERR (director) leading to staffing limitations. (WBNERR is the lead partner for this event.)
Great Marsh Symposium (Upper North Shore)	Seeking to invigorate the education and outreach component of their work, in lieu of the Symposium the Great Marsh Coalition voted to create a series of partner-led field trips on various topics throughout the region (Argilla Road Redesign, Climate Change: Taking Action with Modern Mapping Techniques, Goldilocks of the Marsh Hydrology, Climate Cafes, etc.). RC hosted a Boat Tour of Great Marsh Resiliency Projects in Essex Bay in Fall 2019.

Title	**Represent MassBays to relevant networks (Central staff, all regions)**
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	(Ongoing) Provide input to existing working groups on topics relevant to MassBays' desired outcomes
Partners	Multiple
Status	MassBays staff and RCs continues to play an important role as convener and member of local, regional, state-wide, and national networks.
Accomplishments and deliverables	
Substantive input to multiple networks across a plethora of topics	In addition to climate change and stormwater networks listed here, a list of networks/organizations and MassBays' roles is included as Attachment G.

Title	Chair the Association of National Estuary Programs
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	To increase the Association's effectiveness in terms of joint program development, cooperative program implementation, and idea-sharing across the NEPs.
Partners	28 NEPs, EPA HQ, NERRA, CSO, IOOSA, RAE, Farm Journal
Status	Election for Chair is in November 2020; actively recruiting candidates who will continue to build ANEP capacity while maintaining transparency in decision making. Implementation of the Roadmap is underway with the help of a consultant.
Accomplishments and deliverables	
Roadmap developed	With the assistance of an external facilitator, ANEP members collaborated to develop a Roadmap for future activities, with the goal of realizing increased cohesiveness and impact for the organization.
NEP Technical Transfer (Fall) and Spring meetings planned	The Tech Transfer meeting was held in Dewey Beach, DE in October 2019. Regular EPA-NEP planning meetings, as well as smaller working group meetings focused on individual sessions, were held leading into March 2020. Full agenda was in place when stay-at-home directive was declared.
Monthly calls held	Facilitated alternating monthly calls for the Executive Committee and Board.
ANEP-EPA HQ working groups in place	Active groups during the past year include: Equity, diversity, and inclusion; Nutrients removal; Spring meeting, Communications.

Title	City Nature Challenge – Boston Area (Central Staff, all regions)
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	To engage diverse learners in watershed and coastal science education and bring new audiences to MassBays' mission
Partners	Brandeis University, New England Aquarium, Zoo New England, Earthwise Aware, Earthwatch Institute, New England Ocean Science Education Collaborative, Suffolk University, UMass Boston
Status	Completed May, 2019. Across the Boston area (which this year reached out to Cape Cod), we encouraged documentation of nature in homes, backyards and neighborhoods, individually and as families; and participation online by helping to identify or annotate observations. Used iNaturalist as a social platform and community to come together online to document biodiversity.
Accomplishments and deliverables	
Expanded reach	MassBays supported and contributed to efforts to engage Cape Cod communities in this year's event, so that the effort would encompass the entire MassBays planning area.
Supported partnerships and convened new partners	ED served on the steering committee, provided onsite facilitation of a meeting at Franklin Park Zoo to introduce partners to the effort, and assisted in re-envisioning the event to incorporate social distancing and backyard-based observing.
MassBays planning-area observations & observers documented	The iNaturalist project page (https://www.inaturalist.org/projects/city-nature-challenge-2020-boston-area) documents approximately 10,000 observations in the planning area, providing new (if informal) data for our use in describing our region, and connections through the social network to up to 1000 people interested in the ecosystem.

Title	**Merrimack River CSO Working Group (Upper North Shore)**
CWA Core Programs	Identifying polluted waters and developing plans to restore them
Objective	Provide guidance and input and seek funding for CSO projects recommended by the Merrimack River CSO working group
Partners	Merrimack River communities, Upper North Shore Legislative Delegation, DEP
Status	A Merrimack River District Commission was established and is developing an integrated framework for decision making with the help of a consultant.
Accomplishments and deliverables	
Merrimack River District Commission formed	UNS RSP co-leads, and MassBays ED serves on the Commission, which was established and funded by the Legislature.
Consultants retained	RSP engaged a contractor to develop an integrated framework for decision making on the Merrimack and helped select a steering committee and technical advisory group to do this work. MVPC is also leading the effort to hire a contractor to develop a "early alert" flagging system for the river and the City of Newburyport.

Title	**Support municipal and regional actions that promote resilient coastal habitats and communities through the use of nature-based solutions (All regions)**
CWA Core Programs	Protecting wetlands
Objective	Work with partners and communities to encourage planning for climate change including stormwater management and adoption of adaptation measures that promote resilient coastal habitats, especially via nature-based solutions.
Partners	TTOR, Tufts, UNH, BU, Pew Foundation, MassAudubon, Northeast Coastal Coalition, LGCs, CCC, NOAA Restoration Center, WBNERR, CZM
Status	MassBays continues to be a key player in communication and outreach efforts, planning initiatives, and implementation of nature-based coastal protections.
Accomplishments and deliverables *Climate resilience*	
Regional meetings, workshops, and field visits hosted	All RCs and Central Staff hosted and/or participated in events describing the impacts of climate change, especially regarding sea level rise and more frequent and severe storms. For example, the LNS RSP sponsored a monthly presentation at various venues about climate change, coastal resilience, and adaptation.
Participated in regional planning efforts	All RCs and Central Staff contributed to regional plans, including The Trustees' coastal strategy, North Shore Drought Management Committee, PIE-Rivers Restoration Committee, Cape Cod and South Shore Conservation Agents' networks, etc. Several of these efforts resulted in applications for funding (listed above).
Implemented coastal resilience grant	LNS RC is the Project Lead on Marblehead's CZM Coastal Resilience Grant titled "Increasing Resilience through Community Engagement: Facilitating Implementation of Climate Adaptation Strategies for Marblehead and its

	Harbor." She has conducted multiple meetings with stakeholder groups around the Harbor to discuss their current issues and concerns around storms and flooding and organized a public presentation: "Prioritizing Coastal Resilience in Massachusetts: Modeling Inundation Risk in a Changing Climate" that was attended by 280 people. Kirk Bosma from the Woods Hole Groups shared the coastal flood modeling results for the Town and Marblehead Harbor, under changing climatic conditions (present, 2030, 2050, 2070). Video of the presentation is available at www.salemsound.org
Installed of living shoreline (LNS)	Collins Cove (Salem) Living Shoreline was the culmination of 4 years of planning, design and permitting. RSP recruited and trained 130 volunteers to restore 0.75 acres of fringing salt marsh by planting over 15,000 salt marsh plants. RSP conducted the first monitoring assessment in September and SSU Geography Department continues to map and photograph with its drone to provide pre-documentation and 3 flyovers annually. In October 2019 three Nor'easters and a bomb cyclone required some emergency maintenance by RSP, the City of Salem, CZM, and contractors to repair the leading edge (replaced coir logs and anchorage). Repairs were finished in January, and the final task of twining the stakes to hold down the blanket was completed in April 2020 by the RC and volunteers.
Accomplishments and deliverables *Stormwater management*	
Advanced regional restoration planning efforts (CC)	The RC and APCC's Restoration Coordination Center director worked with the Cape Cod Conservation District to update the list of priority restoration projects for the Cape Cod Water Resources Restoration Project. This effort involves meeting with municipal staff in each of the 15 towns to obtain their input. Restoration projects included salt marsh and fish passage restoration and stormwater mitigation projects to improve and restore shellfish beds.
Expanded Cape Cod regional wastewater planning to encompass stormwater	The RC was a member of a Cape Cod Commission ad hoc subcommittee that developed recommendations for stormwater BMPs to include in the S.208 Technologies Matrix for mitigating nitrogen loading to coastal waters. The 208 Technologies Matrix is a key part of the S.208 Areawide Water Quality Management Plan for Cape Cod, and identifies a large number of technologies for reducing and mitigating nitrogen loading to coastal waters (https://www.capecodcommission.org/our-work/208). Prior to this stormwater subcommittee being formed, the 208 Plan focused on wastewater management. In February 2020 the subcommittee reviewed and voted to recommend stormwater BMPs and measures to add to the 208 Technologies Matrix.
Provided outreach and education to support municipal stormwater management actions on the North Shore and South Shore	LNS RSP provided social media messages to Greenscapes municipal contacts for distribution covering yard waste, dog waste, rain gardens, water conservation, winter salting, and more; distributed over 12,000 new Greenscapes Guide magazines (http://greenscapes.org/greenscapes-guide-2019/); and continued to update the Massachusetts LID web map and used the three LID videos – "Winter Island Rain Garden," "Municipal solutions for Stormwater Problems (Green/Gray middle school projects)," "The Natural Solutions for Clean and Plentiful Water" with teachers and the 23 Greenscapes communities (http://greenscapes.org/lid-toolkit/). SS RSP presented an MS4 primer to the Norwell and Scituate selectboards with related boards also in attendance (Conservation, DPW, Planning). Additional planned outreach was canceled due to coronavirus.

Strategy 2.3 Provide access to, and increase influence on decision making by underserved communities

Title	**Assess the nature of collaborations among organizations on restoration projects in MA (Metro Boston)**
CWA Core Program	Protecting coastal waters through the National Estuary Program
Description/Objective	Network analysis of restoration projects in MA to determine how often different organizations collaborate and on which types of restoration
Partners	DER, EPA, NOAA, DEP, watershed associations, others as identified
Status	Project completed; results of the analysis will be presented at the Summer BHEN meeting
Accomplishments and deliverables	
Master's thesis completed	Delivered to EPA Region 1 for consideration.

Strategy 3.1 Establish target (improved) water quality and habitat conditions for each embayment tied to desired uses and ecosystem services

Title	**Resource Assessment Tool: Development of a Biological Condition Gradient Framework for Estuaries in MassBays. (Central Staff)**
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	With funding and strong technical support from EPA ORD/Narragansett, EPA HQ/OST, and EPA Region 1, MassBays will develop a BCG framework to set and measure progress towards targets for improvement in estuarine ecosystem conditions.
Partners	STAC, EPA Region 1, EPA ORD, OST, UHI
Status	NU incorporated the results of the water transport assessment to conduct data re-analysis and refine the classification of embayments prior to July 1 2020; UHI and ORD identified and compiled data from historical maps and documents regarding key estuarine resources and will be incorporatedinto the BCG process.
Accomplishments and deliverables	
Final EDA analysis conducted	RSP prepared an interim report describing EDA 2.0 re-analysis, which included updating all GIS measurements for Salem Sound embayment and redoing analyses incorporating water residence time and rocky intertidal shoreline data. Final report submitted to Central Staff for integration into the BCG process.

Used historical data to develop GIS maps showing changes in key estuarine resources including salt marsh, eelgrass and tidal flats.	With EPA HQ funding and EPA ORD and S&T technical support, Staff Scientist worked with UHI and EPA ORD together data and develop spatial maps of historical extent in eelgrass, tidal flats, and salt marshes. Staff scientist worked with UHI on Phase 2 of the historical data. Based on review and input by MassBays and EPA ORD to identify usable data as well as data that may be transformed into spatial maps from the inventory of historical data, UHI developing spatial products for eelgrass and tidal flats using historical maps and datasets. Staff scientist also worked with EPA ORD to develop spatial products using historical maps depicting saltmarsh based on methodology applied in the Narragansett Bay NEP.
Developed eco-types that will serve as the basis for building the BCG for embayment classes.	Staff scientist worked with Emily Shumchenia to develop eco-types in MassBays. This was informed by specific datasets from EDA 2.0. The results were presented to STAC in November 2019 for discussion and input. Embayment/ecotype allocation was discussed for each embayment during a meeting with the RCs (December 2019) who are most familiar with these assessment areas. Feedback used to refine and finalize the eco-types which will serve as the basis for the BCG going forward. A STAC meeting in February 2020 served to finalize the proposed ecotypes.

Strategy 3.2 Guide local action to expand habitat and improve water quality according to targets

Title	**State of the Waters: Cape Cod (Cape Cod)**
CWA Core Program	Identifying polluted waters and developing plans to restore them
Objective	To provide a comprehensive "State of the Waters: Cape Cod" program to promote action to protect and restore water quality. The project is intended to serve as a model for other communities.
Partners	Buzzards Bay Coalition, Center for Coastal Studies, Cape Cod Commission, SMAST-UMass-Dartmouth, WBNERR, MBL Ecosystems Center, towns of Chatham, Eastham and Mashpee, CZM, MassBays, Massachusetts Environmental Trust.
Status	The State of the Waters: Cape Cod project is a regionally important project that for the first time presents a Cape-wide summary of water quality in terms of "Acceptable-Unacceptable" grades that can be easily understood by the public. As nutrient loading has been identified as the Cape's major water pollution issue, grades are based on eutrophication indicators. Coastal embayments, ponds and drinking water are graded based on the most recent data available. 2019 grades indicated that More than two-thirds of coastal embayments and approximately one-third of ponds are suffering from unacceptable water quality due to excess nutrients. As most of the Cape is served by Title 5 septic systems and only small areas are served by publicly-owned wastewater treatment facilities, the main cause of unacceptable water quality in both coastal embayments and fresh water ponds is excess nutrients due to inadequately treated wastewater, followed by poorly treated stormwater runoff. The SOTW will be updated in 2020 using available new data.

Accomplishments and deliverables	
2018 Report Cards developed and published online	CC RSP convened an expert advisory group (Attachment H is the member list) to devise a method for scoring and grading of water quality data for 152 coastal stations, 48 coastal embayments, 149 freshwater ponds and lakes monitored by the Ponds and Lakes Stewardship Program (PALS), and 20 public water supplies. Coastal water quality was scored using the Buzzards Bay Coalition's Eutrophication Index. Freshwater ponds and lakes were scored using the Carlson Trophic Index. Public water supplies before distribution were scored and graded using the Natural Resources Defense Council's (NRDC's) method for grading drinking water. APCC addressed advisory group's comments by: 1) adopting a grading system that preserves scores and grades of individual stations in coastal embayments while still grading the embayment on whether there is at least one segment that needs restoration ("Unacceptable: requires immediate restoration") or whether all segments are acceptable ("Acceptable: requires ongoing protection"); and 2) re-scoring some coastal water quality data to account for proximity to salt marsh.
Outreach materials produced	Resulting grades for coastal waters and embayments, ponds and lakes, and drinking water supplies are presented in the interactive map on the *State of the Waters: Cape Cod website* at www.capecodwaters.org. "Why is a Water Report Card Needed?" FAQ, *2019 Water Health Report* and the *Cape Cod Water Action Plan* (outlining problems, needs, and recommended actions for progress on aquatic ecosystem improvement at the local, regional and state levels) are included at this site. The *Cape Cod Water Action Plan* was also presented at APCC's annual meeting on 10/1/19.

Title	**Maintain Adequate Streamflow (South Shore)**
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	Support the Town of Scituate in the effort to raise their reservoir and provide adequate streamflow in the First Herring Brook
Project partners	Town of Scituate, DER
Status	The RC continues to work with the town on the reservoir raising project, which is still seeking funding.
Accomplishments and deliverables	
Assured maintenance of streamflow	A successful season of using the MassBays/NSRWA developed streamflow management tool (Attachment I) concluded in October 2019, with the tool being used to reassure the town with solid data when they were concerned about lower reservoir levels.

Title	**Eelgrass Restoration (Upper North Shore) and Restoration Documentation (Metro Boston)**
CWA Core Programs	Protecting coastal waters through the National Estuary Program
Objective	UNS: Restore eelgrass at additional sites in Plum Island Sound; monitor existing Plum Island Sound pilot Eelgrass site and continue restoration effort; investigate and establish eelgrass pilot site in Joppa Flats; engage volunteers also citizen stewardship in the Great Marsh. Eelgrass re-establishment at multiple locations in the Great Marsh will increase marsh resiliency and habitat. MB: Communicate and disseminate the results of a project surveying seagrass restoration results and management projects to inform future efforts.
Partners	EPA, BU, Parker River NWR, DMF, MassAudubon, Seagrass Net, BHEN, EPA
Status	Restoration planting continues with the assistance of volunteers at several sites, as does monitoring at previous plantings sites. Story Map is in final review.
Accomplishments and deliverables	
Established pilot sites in Plum Island Sound (UNS)	Six harvest and planting sessions using tens of thousands of plants has been performed to date, including March 2020, at the newly established Plum Island Sound, Nelson Island eelgrass site. Numerous volunteers from New England Aquarium, Audley Travel, Gulf of Maine Institute, Governors Academy, and Gloucester Public Schools assisted in the harvesting or planting efforts
Initiated genetic analysis of successful strains (UNS)	The Essex Bay eelgrass site (installed 2014-2018) was monitored visually for robustness on several occasions throughout the summer and fall and is currently being evaluated by Northeastern University for isotope profile (funded by MVPC) to determine genetic strain most suitable to the site.
Initiated site suitability assessment (UNS)	Light sensors were installed in the Joppa Flats intertidal area for determining the potential for eelgrass restoration. Additional parameter measuring is planned for collection here this spring.
Compiled data from survey of restoration practitioners (MB)	Seagrass restoration and management data were compiled, including locations of all known restorations in MA with information on the timing, method, and success of each project, as well as a description and visual depiction of the different restoration techniques. A working draft of the Seagrass Restoration Story Map is available, with links to additional information while EPA's Phil Collarusso reviews the tool.

Title	**Monitoring and Treatment of Invasive Phragmites in the Great Marsh (Upper North Shore)**
CWA Core Program	Protecting wetlands
Objective	Reduce the spread of invasive reed.
Partners	Parker River NWR
Status	Nearly all of the remaining open marsh Phragmites in the Great Marsh was treated in 2019

Accomplishments and deliverables	
Treatment of 115 acres carried out	Approximately 90 acres of Phragmites was treated in the Salisbury marshes using a Marshmaster for large, high density stands, while several contractors using backpack sprayers treated low density stands in marshes to the south of the Merrimack River (25 acres).
Established measures of success	Nine new Phragmites monitoring sites were established in Salisbury, Newbury and Rowley to determine more succinctly the success of treatment response. Parameters include number and height of stems, ambient vegetation, and maturity at selected transects.
Report provided to stakeholders	RC presented at the Great Marsh Revitalization Task Force annual meeting in December 2019, providing an update to more than 50 attendees on the state of the Phragmites management in the Great Marsh

Activity	**Pepperweed Management and Control (North Shore)**
CWA Core Program	Protecting wetlands
Description/Objective	Reduce pepperweed in Salem Sound, Merrimack River, Newbury, and Ipswich marshes
Partners	Mass Audubon, PRNWR, volunteers, MA-ME-NH Invasives Workgroup
Status	This is an ongoing effort to prevent widespread occurrence
Accomplishments and deliverables	
Riverbanks treated	Boat access-only areas within the mapped region treated in July 2019 included banks and islands within the lower Merrimack River, areas along the Parker River, Nelson's Island, and areas along and adjacent to the Ipswich River as well as Crane Beach.
Eleven volunteers pulled 38 bags of pepperweed	Collins Cove, Salem (7/9/19) 4 bags; Derby Wharf, Salem (June- July) 1bag; Forest River Park, Salem (7/18/19) 5 bags,; South (7/25/19) 10 bags; Palmer Cove, Salem 1 bag; Marblehead Forest River Conservation Area (7/26/19) 17 bags

Travel expenditures, July 1, 2019 – June 30, 2020

MassBays Central Staff (SS = Staff Scientist, ED = Executive Director) were reimbursed approximately $4000 in travel expenses (mileage/airfare/ground transportation, per diem, registration). A detailed Table 3 documenting the travel dates, travelers, location and purpose of travel, and amount of reimbursement is pending access to hard-copy paperwork.

C. New and Ongoing Projects (July 1, 2019 to June 30, 2020)

Strategies and Outcomes

As noted above, MassBays submitted its Revised CCMP to EPA in January 2019. Through implementation of the CCMP, we anticipate achieving the following Outcomes:

A. Sustainable NEP
B. Improved habitat continuity and restored hydrology
C. Improved water quality
D. Resilient coastal habitat, including nature-based coastal protection
E. Restored natural communities
F. Robust interagency and interdisciplinary collaboration and partnerships
G. Well-informed, multisector input to decision making which includes underserved communities

Our proposed work for Federal Fiscal Year 2020 is aligned with and driven by the following Goals and Strategies described in our Revised CCMP:

Goal 1. MassBays provides new resources to support research and management in the Bays.
Strategy 1.1 Address data gaps
Strategy 1.2 Support valid (QA/QC) data collection and use

Goal 2. MassBays reaches all planning-area municipalities with actionable information about coastal habitats
Strategy 2.1 Support research to inform policy and actions
Strategy 2.2 Technical support and communications
Strategy 2.3 Increase influence of underserved communities on decision making

Goal 3. MassBays provides regular and locally informed State of the Bays reporting that reflects the unique characteristics of MassBays assessment units (embayments, rocky shore, barrier beach), and documents progress toward target conditions.
Strategy 3.1 Establish target conditions
Strategy 3.2 Guide local action for expanded habitat and improved water quality

Our proposed tasks are also closely related to the Clean Water Act Core Programs, which are:
(1) establishing water quality standards
(2) identifying polluted waters and developing plans to restore them (total maximum daily loads)
(3) permitting discharges of pollutants from point sources (National Pollutant Discharge Elimination System permits)
(4) addressing diffuse, nonpoint sources of pollution
(5) protecting wetlands
(6) protecting coastal waters through the National Estuary Program
(7) protecting Large Aquatic Ecosystems.

The figures below depict estimates of the Level of Effort (LOE) to be expended toward each Strategy. The division of labor between the Boston office (Central Staff) and regional partners (RSPs) is evident when the two are compared. During the coming year, Central Staff (see Figure 2) will focus on making sure the supports for implementing our CCMP are in place – leading the effort to set targets, ensuring the availability of valid data relevant to those targets, and devising strategies and securing funding to work toward those targets at the planning-area level. RSPs (Figure 3) are focused on local implementation and progress toward improved habitat and water quality conditions, through data gathering and direct support in local communities. Our cumulative efforts will help us make strides toward meeting the Goals of our CCMP.

Figure 2. *Central Staff (salary, fringe, and indirect charges) expenditures predicted for FFY2020. This includes funding from the EPA Exchange Network to support work of the Monitoring Program Circuit Rider, whose time is dedicated to Strategy 1.2.*

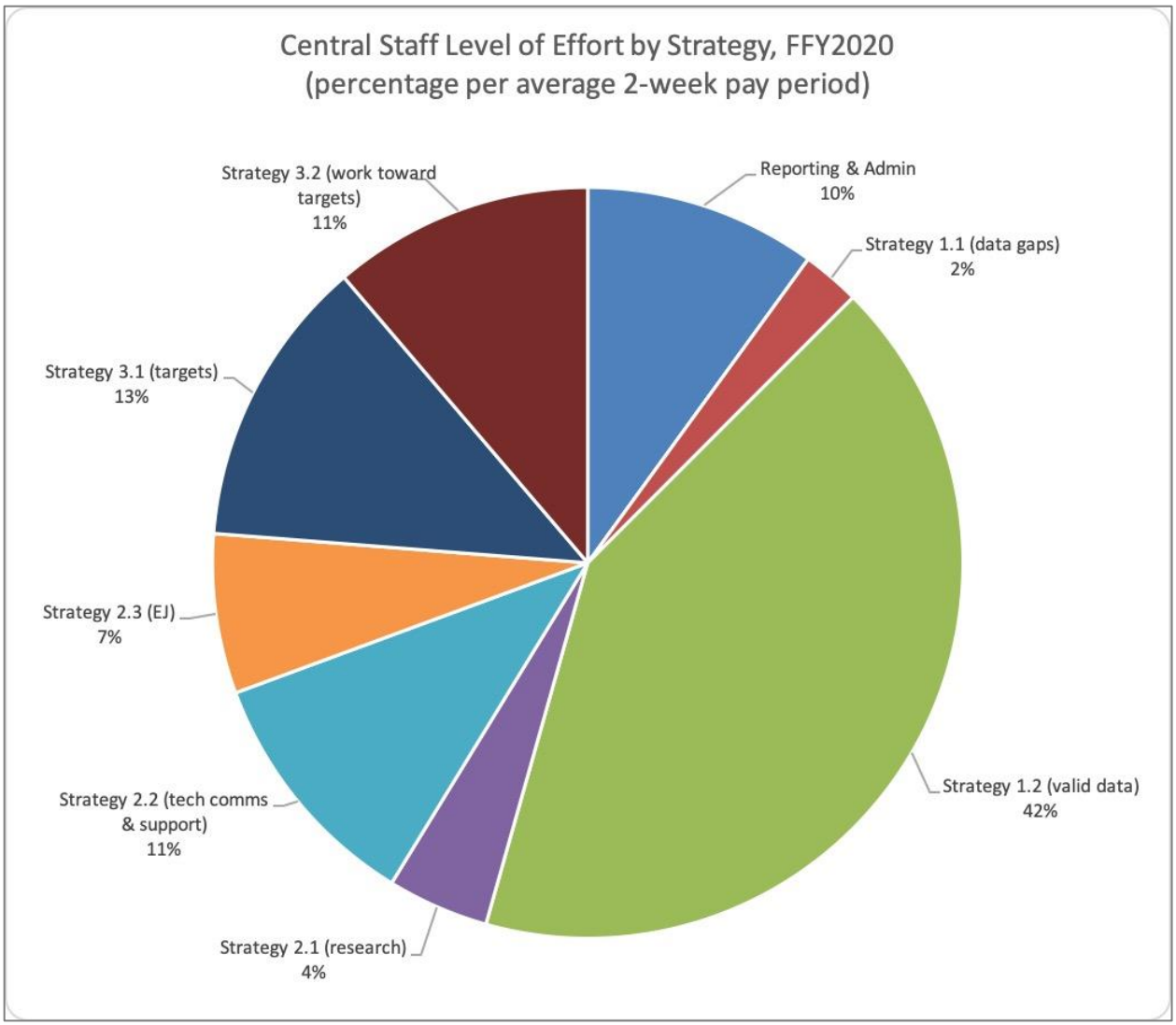
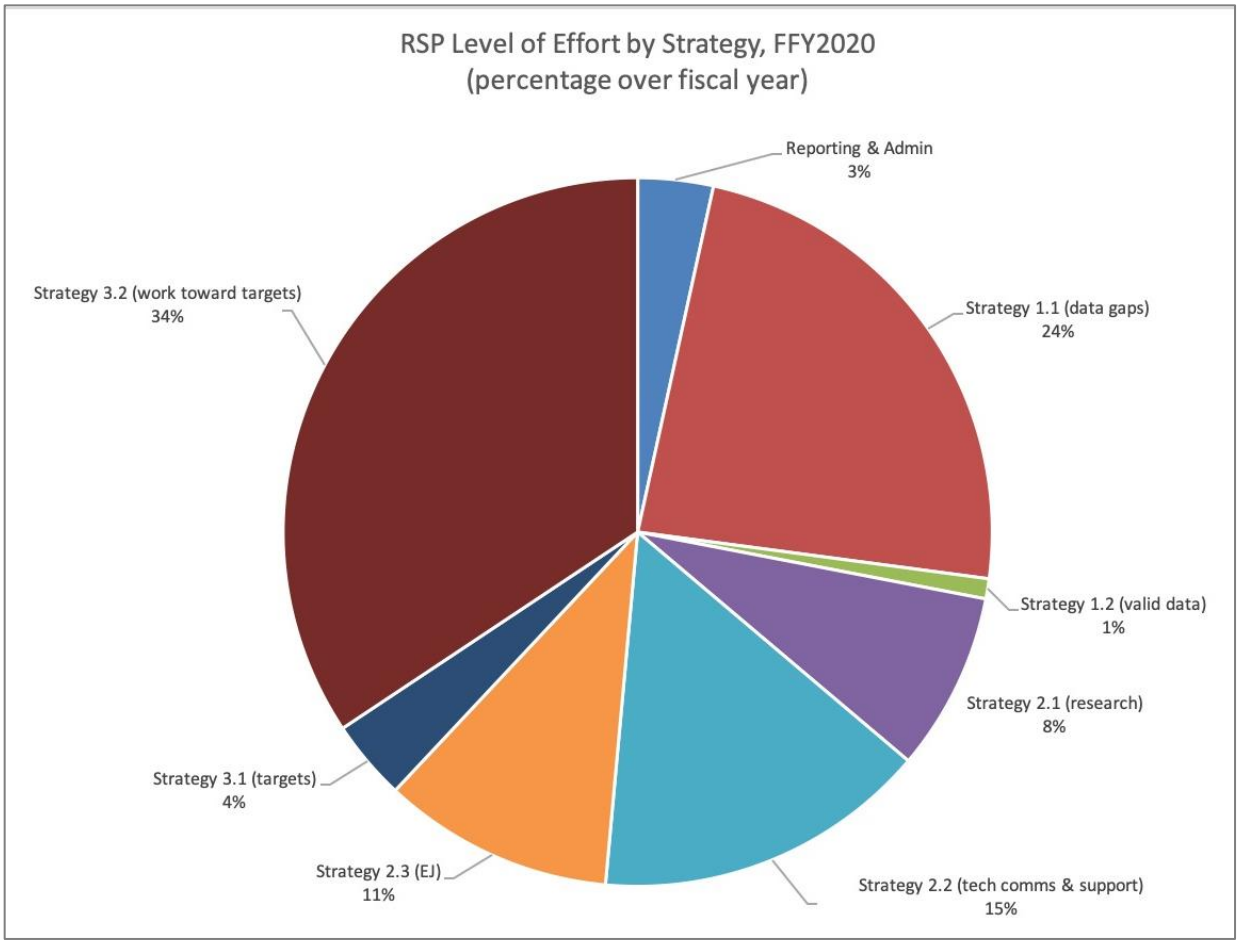


Figure 3. *Regional Coordinator LOE allocated from RSP Grant funds ($63,000 distributed per region) to each strategy.*



The table of proposed activities below includes the following:

Title (Region), Budget/LOE: Activity name and MassBays geographic region in which it will be carried out, and non-s.320 funding and/or RC LOE (for region-specific projects)
Description*:* Status (New or Ongoing), project activities and objectives
CWA Core Program*:* Per list (1-7) above
CCMP Outcome*:* Per list (A-G) above
Partners*:* Collaborators not directly funded by MassBays/§320 funds
Timeline & Deliverables*:* Product(s) expected, and the quarter (Q1-Q4) projected for their completion

Strategy 1.1: Make new data available, especially to address specific gaps in knowledge

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Monitor Cyanobacteria blooms (Cape Cod) $25,000 + 120h	***Ongoing*** Since FY18 APCC has been monitoring cyanobacteria in lakes and ponds that discharge to estuaries and serve as diadromous fish spawning habitat. The goal is to collect useful actionable information on harmful cyanobacteria blooms for the public and decisionmakers. Monitoring has provided actionable information, including one pond closure, and elicited interest from other agencies (e.g., USGS, EPA). To date, 30+ ponds have been monitored. Owing to COVID-19 in 2020, use of volunteers will be restricted or eliminated, and the 2020 goal will be to maintain the monitoring program at or near the 2019 level. If the situation improves, the program may be expanded. ***New*** regional outreach and data evaluation	(2) Identifying polluted waters and developing plans to restore them; (6) Protecting coastal waters through the National Estuary Program (C) Improved water quality	Towns of Brewster, Chatham, Barnstable, Dennis, Eastham, Falmouth, Mashpee, Wellfleet, Yarmouth, MA Department of Public Health, MA DEP, EPA, and NGOs.	(Q3-4) Approved QAPP for rapid reconnaissance monitoring, (Q4) Train and supervise staff and interns re: protocol, collect and analyze data, (Q1-2) outreach to regional networks (Barnstable County Coastal Resources Subcommittee; APCC webpage and interactive map of results), (Q3-4) Report evaluating pilot test results comparing two methods of estimating cyanobacteria concentrations
Macro and Microplastics Sampling (Upper North Shore) $15,000, 50h	***New*** Develop a detailed sampling program for microplastics in the waters of the Merrimack River, Plum Island Sound, and Essex Bay, based on pilot sampling in Great Marsh waters using NOAA protocols.	(4) Addressing diffuse, nonpoint sources of pollutants (C) Improved water quality	Seaside Sustainability, Northern Essex Community College, Governors Academy, ETGM LGC	(Q1) Great Marsh monitoring completed, (Q2) results compiled, (Q3-4) sampling design for rivers and outfalls

Strategy 1.1 *continued*

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Monitor diadromous fish runs (South Shore) 100h (Cape Cod) $11,200 in-kind + 140h	***Ongoing*** Provide local, state and federal fisheries managers with population estimates of river herring at monitored runs to inform protection, restoration and management efforts. Monitoring by volunteers also supports citizen stewardship of runs. RC will support citizen monitoring of fish runs by providing partners and volunteers with training, data management, QA/QC, reporting, and other assistance. ***New*** Investigate use of dataloggers to monitor water temperatures and cameras to facilitate counts.	(6) Protecting coastal waters through the National Estuary Program (B) Improved habitat continuity and restored hydrology	MassDMF, NOAA Fisheries, River Herring Network, South Shore towns, towns of Barnstable, Brewster, Chatham, Dennis, Eastham, Falmouth, Harwich, Mashpee, Orleans, Sandwich, Wellfleet, Yarmouth, and NGOs (Friends of Herring River, Bass River Rod & Gun Club, Cape Cod Salties, Coonamessett River Coalition, Harwich Conservation Trust, etc.)	(Q2-4) Outreach and training: River Herring Network participation in Fall, Spring 2021 training sessions for volunteers, outreach materials, (Q2) Final data report for 2020 herring counts submitted to DMF, (Q2) participation in River Herring Network annual conference in Fall 2020, (Q4) Report on volunteer efforts for Spring 2021 herring counts, (Q4) Synthesis report of 2- to 10-year data sets through 2020 for Cape Cod, (Q4) Monitoring camera installed in South River and temperature data loggers in Cape Cod streams
Publish salt marsh monitoring data from 2003-2015 (Cape Cod) $6000 + 20h	***New*** Between 2003 and 2015 APCC monitored more than 15 salt marshes to compare pre-restoration and post-restoration conditions. Reports were provided to state agencies but are not readily accessible otherwise. This information should be made available to resource managers, particularly as climate change and sea level rise may affect coastal wetlands. A short report would also help to build public support for protecting and restoring salt marshes.	(5) Protecting wetlands (B) Improved habitat continuity and restored hydrology	DER	(Q2) data analysis and summary report covering eight salt marshes, (Q4) outreach materials e.g., newsletter article, webpage

Strategy 1.1 *continued*

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Water quality monitoring (South Shore) $12,500 + 50h	***Ongoing*** Citizen monitoring in coastal waters to identify potential for remediation and source control, through the Riverwatch program in the North and South Rivers and the DKP Water Quality Monitoring Program; ***New*** Conduct bacterial source tracking in North River Headwaters with Town of Hanover (pending funding)	(2) Identifying polluted waters and developing plans to restore them (C) Improved water quality	Volunteers, Towns of Duxbury/Kingston/ Plymouth/Hanover	(Q1) Riverwatch volunteer monitoring completed, (Q2) Monitoring plan for DKP, (Q3) Monitoring results
Water Monitoring Program: Clean Beaches & Streams and Upstream Tributary Sampling (Lower North Shore) $20,000 + 260h	***Ongoing*** Identify sources of pathogen pollution to Massachusetts' waters, specifically Salem Sound and its tributaries, particularly illicit sewage discharges and faulty sewer and stormwater systems, and promote their remediation. Activities include biweekly summer water testing for *Enterococcus* at outfalls and streams, and sharing data with municipal staff to prompt action.	(2) Identifying polluted waters and developing plans to restore them (C) Improved water quality	Manchester Coastal Stream Team, Volunteers, DMF, EPA	(Q1) Report on bacterial levels for 15 - 18 outfalls or streams, results published on SSCW website, (Q2) new and past monitoring data uploaded to WQX, (Q1-4) List of remediation actions taken up by municipalities.
Coastal Acidification Monitoring and Management (Central Staff, South Shore) 50h	***New*** Monitor coastal acidification conditions in Duxbury Bay, a hotspot for shellfish aquaculture industry in Massachusetts. Volunteers will be trained by UMB and SS RC. Monthly samples will be collected by SS RC and volunteers for analysis of TA and DIC by EPA ORD (Narragansett Lab)	(6) Protecting coastal waters through the National Estuary Program (C) Improved water quality	Town of Duxbury, UMass Boston, EPA, Massachusetts Ocean Acidification Commission members	(Q3) QAPP for discrete sample collection (CS), (Q1) system deployed (UMass Boston & CS) (Q3) Volunteers trained to maintain CA logger and maintenance log, (Q3-4) chain of custody forms and field sheets, 4) outreach about coastal acidification, (Q1-4) Participate in Governor's Commission on Ocean Acidification (RC), (Q4) final report (UMB and CS)

Strategy 1.1 *continued*

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Assessing Coastal Acidification (Lower North Shore) $2000 + 260h	***Ongoing*** Conduct citizen monitoring program to document pH and temperature in pore water at three mudflats, host and present outreach education to students, teachers (via a teacher institute on climate change), and the public, and participate in NOAA and EPA OCA Networks, NECAN, and other relevant groups, including Shell Day	(6) Protecting coastal waters through the National Estuary Program (C) Improved water quality	NECAN, EPA, MIT Sea Grant, SSCW volunteers	(Q1) July, August, September monitoring carried out, (Q4) list of lectures and presentations provided, (Q3) summary of monitoring results, with recommendations for following year, (Q4) report on participation in regional efforts
Monitoring Long-term Salt Marsh Vegetation Change (South Shore) 100h	***Ongoing*** Work with volunteers to monitor salt marsh vegetation changes through the Salt Marsh Sentinels program, ***New*** document salt marsh change using drone technology (pending funding)	(5) Protecting wetlands (D) Resilient coastal habitat, including nature-based coastal protection	Dock owners, drone pilot	(Q2) Report on findings and project participation of dock owners in collection of salt marsh data, (Q3) Photos and initial report on information provided by drone

Strategy 1.1 *continued*

Title (Region) , Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Salt Marsh Monitoring for Climate Change (Lower North Shore) $18,000 + 300h	***Ongoing*** Conduct citizen science monitoring in August at six salt marshes for vegetation and salinity to record long-term climate change impacts on salt marshes from sea level rise, storm surge and other impacts. Conduct a comparative analysis of results analysis with long-term datasets to provide local, state and federal wetland managers with data on salt marsh conditions to inform protection, restoration and management efforts.	(5) Protecting wetlands (D) Resilient coastal habitat, including nature-based coastal protection	MET, MA CZM, MA DER, Volunteers	(Q1) QAPP submitted for new baseline data collection (Q1) Outreach materials and online training sessions for volunteers, (Q2) Long-term marsh data analysis, (Q4) List of presentations and publications regarding the results
Horseshoe Crab Spawning Surveys (South Shore) 100h	***Ongoing*** Conduct horseshoe crab spawning surveys in Duxbury Bay to assess the population	(7) Protecting large aquatic ecosystems (E) Restored natural communities	DMF, Town of Duxbury, Duxbury Beach Reservation Inc.	(Q1) 2020 data submitted to DMF (Q4) 2021 surveys completed

Strategy 1.1 *continued*

Title (Region) , Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Mussel Bed Water Quality Monitoring (Upper North Shore) $5000 + 25h	***Ongoing*** Using water quality data collected in the previous year at healthy blue mussel beds, locate three sites in the Great Marsh where similar water quality should exist and deploy water quality monitoring equipment. After several months of data collection, report out data. Determination of water quality parameters at each location will inform potential future mussel bed sites. These sites are being monitored for quality for future development of a mussel reef living shoreline.	(6) Protecting coastal waters through National Estuary Program (D) Resilient coastal habitat, including nature-based coastal protection	DMF, Eight Towns and the Great Marsh LGC volunteers	(Q1) Purchase and deployment of water quality equipment, (Q1-3) results for DO, conductance, salinity, temperature, and pH, (Q3) Interim report and recommendations
Monitoring Marine Invasive Species (North and South Shore) $2500 + 120h	***Ongoing*** Monitor established field sites for non-native species in cooperation with CZM's MIMIC program, conduct training for monthly monitoring from July to October 2020, and share results with CZM and the public. LNS also monitors settle plates at the Beverly Pier to understand fouling organisms.	(7) Protecting large aquatic ecosystems (E) Restored Natural Communities	CZM	(Q2) data submitted to CZM, photodocumentation of settle plate fouling, (Q4) list of presentations and publications shared
Monitoring and Mapping of Invasive Phragmites in the Great Marsh (Upper North Shore) $15,000 + 85h	***New*** Invasive Phragmites in the open marsh in east Salisbury marsh, northern Plum Island Sound, and along the marshes of the Plum Island River will be mapped to define the effectiveness of previous Phragmites management practices. Nine established monitoring locations will be surveyed.	(5) Protecting wetlands (E) Restored Natural Communities	PRNWR, contractors	(Q1-3) Interim report of status of Phragmites in marshes and at monitoring sites, including photo documentation and maps.

Strategy 1.1 *continued*

Title (Region) , Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Data Sharing via WQX (Central Staff - All Regions) $25,000	***New*** Increase accessibility to new and historic data generated by watershed groups by providing training and support to facilitate data upload to EPA's WQX framework	(6) Protecting coastal waters through the National Estuary Program (C) Improved water quality	EPA Region 1 Ecology Monitoring Team, Mass Rivers Alliance, EPA Exchange Network	(Q3) Second-round WQX training workshop, (Q4) At least 12 groups submit data to WQX.
Water Quality and Benthic Communities Monitoring in Salem Sound (Central Staff, Lower North Shore) $50,000 + 100h	***Ongoing*** implement July-September monthly nutrient monitoring and ***New*** design and implement benthic community assessment program in Salem Sound.	(6) Protecting coastal waters through the National Estuary Program (C) Improved water quality	CZM, SSU	(Q1) Approved benthic QAPP; (Q2-3) Technical report presenting results and management recommendations (with CS); (Q4) list of presentations and publications
Massachusetts Coastal Condition Assessment (Central Staff - All Regions) $150,000	***New*** Conduct monthly survey across all MA coast to assess coastal conditions. Survey will be conducted between 2020-2023. Survey includes water quality monitoring, sediment quality monitoring and identification of benthic macroinvertebrates from 90 sites (15 sites in 2020).	(2) Identifying polluted waters and developing plans to restore them (C) Improved water quality	DEP	(Q1) approved QAPP; (Q4) technical interim report presenting results.
2020 MassBays Healthy Estuaries Grant (Central Staff – All Regions) $95,000 (FFY19 funds)	***Ongoing*** MassBays will administer the 3rd round of the grant (2020-2021). Technical support will be provided as needed by the Regional Service Providers for projects in the respective regions.	(6) Protecting coastal waters through the National Estuary Program (A-G) All outcomes	TBA	(Q1) List of awarded grants; scopes of work and contracts.

Strategy 1.2 Support valid (QA/QC) data collection and use

Task Title (Region) , Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Supporting use of AquaQAPP (Central Staff – All regions) $30,000	***New*** Support monitoring groups in the use of online QAPP generator	(2) Identifying polluted waters and developing plans to restore them (C) Improved water quality	DEP, EPA	(Q1) Final application released, (Q2-4) Training, materials and support provided to monitoring groups
Data Quality training and support (Central Staff – All Regions) $20,000	***Ongoing*** Improve capacity to collect high-quality data through training and one-on-one technical support to watershed groups. Provide support with QAPP development, project planning, and data interpretation	2) Identifying polluted waters and developing plans to restore them (C) Improved water quality	Mass Rivers Alliance, Citizen Science Association, National Water Quality Monitoring Network	(Q1-4) Meet one-on-one with at least 20 individual watershed groups to provide support and host at least 3 group trainings and/or workshops
Increase use of citizen monitoring data (Central Staff – All Regions)	Support monitoring groups in the sharing of their data with other nearby programs to find efficiencies, facilitate communication, and provide training and assistance in data access via EPA's WQX framework	(6) Protecting coastal waters through the National Estuary Program (G) Well-informed, multisector input to decision making which includes underserved communities	DEP, DER, DMF, Mass Rivers Alliance, Citizen Science Association, Coastal Monitoring Coordinators' Network	(Q3) Citizen data are integrated into MassBays' Strategic Monitoring Plan implementation, (Q4) Citizen data are highlighted via the State of the Bays/ecosystem tracking system visualization

Strategy 2.1 Support research to inform policy and actions

Task Title (Region) , Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Quantifying Phytoplankton and Turbidity in Salem Harbor (Lower North Shore) $2000 + 40h	***Ongoing*** Collaborate under a Healthy Estuaries grant to Salem State University to determine phytoplankton community structure and provide a better understanding of forcings causing high biomass that has been documented to be responsible for increased turbidity and share results and specific remediation strategies for water quality improvement in Salem Sound	(2) Identifying polluted waters and developing plans to restore them (C) Improved water quality	SSU	(Q1-2) Summary of remediation alternatives and strategies, (Q3) Meeting for local, state, and federal stakeholders to convey results and recommendations, (Q4) Public lecture
Implementation and Monitoring Dam Removals (South Shore) $535,000 + 250h	***Ongoing*** Work with municipalities and other partners to assess feasibility and seek funding for removal of dams and other barriers and collect ecological data pre- and post-restoration. Activities include developing the final design and removal process at Peterson Pond Dam, and documenting progress at Temple Street Dam and Veterans Memorial Park Dam on the South River.	(7) Protecting large aquatic ecosystems (B) improved habitat continuity and restored hydrology	Sea Run Brook Trout Coalition, Trout Unlimited, DFG, Hanover Mall, NOAA Fisheries, USFWS, DER, Towns of Norwell, Marshfield, Duxbury, Hanover, and Pembroke	(Q4) annual progress report to funding agency, (Q4) list of next steps based on initial data collection and partner input

Strategy 2.1 *continued*

Investigating Eelgrass Conditions in Duxbury-Kingston-Plymouth Bays (South Shore) $8000 + 150h	***Ongoing*** Coordinate the annual "Eelgrass Blitz" rapid assessment with citizen scientists to monitor and understand the causes of eelgrass loss.	(7) Protecting large aquatic ecosystems (E) Restored natural communities	MassDMF, Duxbury Bay Maritime School, Town of Plymouth	(Q1) Training materials, (Q2) Number of volunteers trained, photo documentation (Q2) Technical report describing findings and recommendations
Marsh Edge Erosion Monitoring (Upper North Shore) $50,000 + 30h	***Ongoing*** Determine the erosional/deposition status of marsh bank and marsh edge in the creeks and rivers of Plum Island Sound to determine future living shoreline potential.	(5) Protecting wetlands (D) Resilient coastal habitat, including nature-based coastal protection	BU	(Q2) Map of Plum Island marsh banks depicting erosion/deposition status.

Strategy 2.2 Provide education, training, and technical support; share case studies (successful and not); and support collaboration and cooperation on specific topic

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
MassBays State of the Bays planning and outreach (Central Staff)	***New*** Plan and implement the State of the Bays water quality and habitat assessment, report, and outreach activities	All CWA core programs All CCMP outcomes	CZM, DER, DMF, DEP, MWRA, Mass Rivers Alliance, Management Committee, Towns, regional scientific and policy partners	1) State of the Bays Symposium or other public launch of the ecosystem condition tracking tool developed with funding from EPA EN Grant
Chair Association of National Estuary Programs (Central Staff)	***Ongoing*** Lead implementation of the strategic Roadmap, liaise with EPA Headquarters, represent ANEP in partnerships with other associations, facilitate monthly Board and ExComm calls.		28 NEPs, RAE, NERRA, IOOSA, CSO, Farm Journal, Urban Waters Program, EPA HQ, EPA ORD	1) Committees reinvigorated, and delivering on commitments under Roadmap, 2) Spring 2020 (virtual) meeting implemented, Fall 2020 Tech Transfer meeting (virtual) 3) At least one joint proposal among NEPs
Local Priority Program Development (All Regions) $120,000 + 770h	***Ongoing*** Partnership building and project development and implementation with environmental and other partner organizations and entities toward meeting the CCMP goals	All CWA core programs All CCMP outcomes	Municipalities, nonprofits, businesses, and government agencies	(Q1-4) Quarterly updates to the MC regarding local initiatives and progress, (Q4) list of networks that include MassBays as a member
Greenscapes, Merrimack Valley Stormwater Collaborative (North Shore) $71,500 + 1120h	***Ongoing*** Create and disseminate outreach information, activities, and materials on stormwater management to *Greenscapes* member communities and Stormwater Collaborative members	(2) Identifying polluted waters and developing plans to restore them (C) Improved water quality	Ipswich River Watershed Association, Merrimack Valley Planning Commission, Merrimack River Watershed Council, 25+ municipalities in Essex County	(Q2-3) MS4 Outreach and Education (via webinars, lectures, personal assistance), (Q1-2) updated outreach materials: website, workshops, handouts, presentations, (Q1-4) "Keeping Water Clean (KWC)" school program, regional workshops on water quality and quantity issues

Strategy 2.2 *continued*

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Merrimack River CSO Working Group (Upper North Shore) $10,000 + 85h	***Ongoing*** Establish and implement regional goals to improve water quality on the Merrimack River. Oversee and provide administrative and technical support to the MRDC and its members.	(2) Identifying polluted waters and developing plans to restore them (G) Well informed, multisector input into decision making which includes underserved communities	Merrimack watershed communities and legislative delegation, NECC, WWTPs, Merrimack River recreational users, Planning Commissions (MA & NH)	(Q1-4) Meetings of the MRDC & steering committee, (Q2-4) List of MRDC priority actions implemented
Support municipal and regional actions that promote resilient coastal habitats and communities through the use of nature-based solutions (Lower North Shore) $40,000 + 400h	***Ongoing*** Work with partners and communities to encourage planning for climate change and adoption of adaptation measures that promote resilient coastal habitats, and use of nature-based solutions. Activities include assistance to secure funding via MVP program, and plan and implement those projects.	(6) Protecting coastal waters through the National Estuary Program (D) Resilient coastal habitat, including nature-based coastal protection	Lower North Shore municipalities	(Q4) List of communities assisted with MVP projects, (Q3) MassBays newsletter article describing one case study and lessons learned (Q3-4) At least one letter of support for municipal implementation proposal, (Q4) List of presentations and publications
Support municipal and regional actions that promote resilient coastal habitats and communities through the use of nature-based solutions (Metro Boston) 160h	***Ongoing*** Connect NU researchers and other experts to communities interested in green coastal infrastructure and living shorelines. Support and collaborate on regional projects.		BHEN, Metro Boston municipalities	(Q1-4) Three waterfront site visits (virtual as necessary), (Q3-4) At least two letters of support for municipal implementation proposals

Supporting municipal and regional actions for resilient coastal habitats and communities (South Shore) 100h	***Ongoing*** Coordinate regional outreach and education efforts, assist communities in planning MVP projects, and coordinate South Shore Climate Group	(6) Protecting coastal waters through the National Estuary Program (D) Resilient coastal habitat, including nature-based coastal protection	South Shore towns, CZM, MAPC	(Q4) Documentation of MVP community support provided, (Q4) SS Climate Group meeting agendas
Support municipal and regional actions that promote resilient coastal habitats and communities through the use of nature-based solutions (Cape Cod) $22,000 + 180h	***Ongoing*** work with partners and communities to encourage planning for climate change and adoption of adaptation measures that promote resilient coastal habitats, and use of nature-based solutions for coastal resilience.	(5) Protecting wetlands (D) Resilient coastal habitat, including nature-based coastal protection	Town of Wellfleet, Cape Cod Commission, others to be determined	(Q1-4) Assistance to communities in planning MVP projects, attending MVP workshops, (Q1-4) Inventory of resources for developing model bylaws, regulations or policies for climate change adaptations to share with communities, (Q1-4) Recommendations for model bylaw, regulations or policies (e.g., Wellfleet model bylaw for climate change adaptation), (Q4) List of municipalities adopting bylaw changes

Strategy 2.2 *continued*

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Advancing stormwater remediation (South Shore) 40h	***Ongoing*** Provide outreach and technical support re: stormwater management, including LID	(4) Addressing diffuse, nonpoint sources of pollution (C) Improved water quality	MassDEP, South Shore Towns	(Q1-4) Documentation of MS4 outreach in communities, (Q1-4) List of grant proposal support provided
Adopt a Beach and Talking Trash for Clean Oceans (Lower North Shore) $4000 + 450h	***Ongoing*** Work with the public and schools to build marine debris awareness and institute behavior changes. Projects include supporting volunteer "Beachkeepers," hosting community service projects, and educating the public of the seriousness of plastic litter on land and in the oceans	(6) Protecting coastal waters through the National Estuary Program (E) Restored natural communities	Volunteer Beachkeepers, Talking Trash Teens	(Q1-4) Volunteer trainings, beach clean ups, (Q3) List of community service projects, (Q3) report on litter reduction projects implemented in cooperation with restaurants, (Q4) List of relevant publications and presentations
Boston Harbor & Islands Science Symposium (Metro Boston) 320h	***New*** Facilitate communication to a diverse audience about research and monitoring underway in Metro Boston's coastal ecosystems. Activities include working with the steering committee to develop the agenda and secure presenters and field visits, and hosting the event.	(6) Protecting coastal waters through the National Estuary Program (G) Well-informed, multisector input to decision making which includes underserved communities	BHEN, UMass Boston, NPS, (additional partners to be determined)	(Q3) Host Second Boston Harbor & Islands Science Symposium, (Q4) Agenda, attendee list, and summary of evaluation feedback

Strategy 2.3 Provide access to, and increase influence on decision making by underserved communities

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Public Outreach and Education about Climate Change and its Impacts, and Adaptive Measures (Lower North Shore) $11,000 + 400h	***Ongoing*** Increase general climate change literacy and knowledge about coastal resiliency in the region, involving EJ populations wherever possible. Activities will include Community lectures and events, teacher institute on climate change.	(6) Protecting coastal waters through the National Estuary Program (G) Well-informed, multisector input to decision making which includes underserved communities	Lower North Shore towns and cities, SSCW volunteers	(Q1-4) Lecture series and events, photo-documentation of wave tank and other educational resources in use, (Q3) Case study of how teachers integrate LID and climate resilience activities with student stewardship
Watershed and Coastal Science Education (South Shore) 175h	***Ongoing*** Engage diverse learners in watershed and coastal science education, bring new audiences to MassBays' mission, participate in classroom and field professional development for teachers through participation in MassAudubon NOAA BWET Grant as project ecologist	(6) Protecting coastal waters through the National Estuary Program (G) Well-informed, multisector input to decision making which includes underserved communities	Marshfield Community Television, Norwell Community Television, Cohasset Center for Student Coastal Research, MassAudubon	(Q1-4) documentation of accommodation and outreach to support new participation by underserved communities, (Q4) List of events/presentations, videos and podcasts, and publications produced about coastal topics
Conduct Watershed and Coastal Science Education and Outreach (Cape Cod) 200h	***Ongoing*** Communicate about Cape Cod-based activities to the public, including LGC members and other partners, featuring MassBays' support. Project descriptions will be disseminated via multiple outlets, including presentations, newsletters, and websites. ***New*** Investigate and respond to needs of underserved communities	All CWA core programs (G) Well-informed, multisector input to decision making which includes underserved communities	Barnstable County Coastal Resources Subcommittee, WBNERR, CCC, Cape Cod Stormwater Managers Group, EPA, Cape Cod Conservation Agents Network, Barnstable County Coastal Management Committee, Barnstable County Cooperative Extension, River Herring Network, DMF, NOAA Restoration Center, etc.	(Q1-4) documentation of accommodations and outreach to support new participation by underserved communities, (Q4) Cape Cod Coastal Conference, (Q1-4) Documentation of needs and responses to needs of underserved communities

Strategy 2.3 *continued*

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Increase awareness in Metro Boston of MassBays' work and mission (Metro Boston) 400h	***Ongoing*** Engage diverse learners in watershed and coastal science literacy, bring new audiences to MassBays' mission. Activities including hosting two High School Marine Science Symposia and BEACHES (Bridging Each Applicant's Chance for Higher Education Success) for undergraduates, public science cafés, and participating in the City Nature Challenge (CNC)	All CWA core programs (G) Well-informed, multisector input to decision making which includes underserved communities	NUMSC Outreach Team, BHEN, MME, CNC - Boston Area steering committee	(Q1-4) Refine and publicize the Boston Harbor Habitat Atlas, (Q4) List of accommodations implemented to support new participation by underserved communities, (Q4) Demographics of participants and summary of their evaluations of the High School Science Symposia and BEACHES, (Q1-4) Announcements of at least four science cafés, and lists of new MassBays newsletter subscribers, (Q4) At least one coastal event for 2021 CNC

Strategy 3.1 Establish target (improved) water quality and habitat conditions for each embayment tied to desired uses and ecosystem services

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Disseminate results of EDA 2.1 via multiple outlets (Metro Boston) 80h	***New*** Prepare manuscript to be submitted to a peer-reviewed journal	(6) Protecting coastal waters through the National Estuary Program All CCMP outcomes		(Q2) Manuscript submitted to appropriate journal.
Resource Assessment Tool: Development of a Biological Condition Gradient Framework for Estuaries in MassBays (Central Staff – All Regions)	***Ongoing*** Establish BCGs and targets for specific resources and implement an approach to measure progress towards these targets. Evaluate BCGs with available stressor and land use data to inform restoration priorities and strategies. Coordinate with STAC and EPA through the whole process.	(6) Protecting coastal waters through the National Estuary Program All CCMP outcomes	STAC, EPA ORD, EPA S&T	1)Final BCGs for embayment classes; 2) Final restoration and improved condition target; 3) Recommendations on application of BCG to support restoration and protection of aquatic systems within MassBays; 4) Summary notes of STAC discussions.
MassBays Ecosystem Tracking and Reporting (Central Staff – All Regions)	***New*** Develop and implement a system to report on ecosystem conditions in MassBays using indicators.	(6) Protecting coastal waters through the National Estuary Program All CCMP outcomes	UMCES	(Q3) Tracking system with indicators; (Q4) present tracking system at State of the Bays symposium.
Stakeholder Deliberative Process (Central Staff – All Regions)	***New*** Apply an innovative approach to ascertain local priorities and level of stakeholder commitment to working toward specific, improved environmental conditions in embayments in the MassBays planning area.	(6) Protecting coastal waters through the National Estuary Program All CCMP outcomes	UMass Boston	(Q1) list of stakeholder groups for each embayment category; (Q2) four workshops hosted; 3) final report with quantitative analysis of results from stakeholder input.

Strategy 3.2 Guide local action to expand habitat and improve water quality according to targets

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Promote sustainable management of marshes (Metro Boston) 220h	***Ongoing*** Promote healthy estuarine management of Rumney Marsh, Belle Isle Marsh, and/or other marshes in Metro Boston, particularly those including multiple stakeholders and community engagement with local organizations.	(5) Protecting wetlands (E) Restored natural communities	Friends of Belle Isle Marsh, MyRWA, (additional partners to be determined)	(Q1-4) At least two letters of support for restoration design or implementation funding, (Q3-4) At least one proposal submitted to support management for healthy marshes
Pepperweed Management and Control (North Shore) $137,000 + 125h	***Ongoing*** Physical pulling of pepperweed to restore native high marsh community and coastal resilience.	(5) Protecting wetlands (E) Restored natural communities	Volunteers, Parker River NWR, MassAudubon	(Q4) List/map of prioritized sites, 2) Trained volunteers, (Q1, Q4) Map of pepperweed sites with list of areas monitored and/or treated, with status (presence-absence removal)
Eelgrass Restoration (Upper North Shore) $55,000 + 80h	***Ongoing*** Restore eelgrass at Nelson Island site in Plum Island Sound; monitor existing Plum Island Sound pilot eelgrass site; collect additional quality parameters in Joppa Flats and if warranted begin to establish eelgrass pilot site; engage volunteers and citizen stewards in the Great Marsh eelgrass restoration effort.	(7) Protecting Large Aquatic Ecosystems (E) Restored natural communities	Boston University, Parker River National Wildlife Refuge, Mass Audubon, Volunteers (NEAq, GOMI, local schools and businesses, etc.)	(Q1-4) Photos and interim report documenting planting (restoring) Nelson Island site in Plum Island Sound and associated harvesting at sites that match water site conditions, (Q1-4) Measure eelgrass growing parameters at pilot sites in Merrimack River and determine if restoration is viable. If so, begin establishing pilot sites, (Q1-4) Monitor and report on eelgrass success in Plum Island Sound and Essex Bay (previously established)

Strategy 3.2 *continued*

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Manchester-by-the-Sea Shellfish Habitat Assessment (Lower North Shore) $2000 + 60h	***Ongoing*** Conduct bacterial and shellfish population assessments at targeted beaches and mudflats to determine suitability for opening to conditional, recreational harvesting	(2) Identifying polluted waters and developing plans to restore them (E) Restored natural communities	MCST, Manchester Harbormaster, Shellfish Warden, MA DMF	(Q2-4) Shellfish population assessment, (Q4) Status report re: shellfish opening decision by DMF
Promote Low-Impact Development (Lower North Shore) $20,000 + 300h	***Ongoing*** Promote and implement Low Impact Development (LID) and stormwater green infrastructure in MassBays communities; maintain Commercial Street and Winter Island rain gardens in Salem ***New*** Produce training videos re: LID installation maintenance for DPW staff	(4) Addressing diffuse, nonpoint sources of pollution (C) Improved water quality	Greenscapes North Shore Coalition; LNS municipalities	(Q4) List of presentations and publications, and technical assistance and grant support provided by municipality, (Q4) documentation of one newly implemented LID approach, (Q4) Training video available, (Q1-4) Photodocumentation of flood/storm conditions and maintenance at rain gardens
Solutions to Protect Eelgrass from Docks and Recreational Boating (Lower North Shore) $5000 + 600h	***New*** Enhance estuarine seagrass habitat by informing management efforts to reduce stressors impacting seagrass habitat, i.e., habitat fragmentation posed by shading from docks and floats (pending funding)	(7) Protecting large aquatic ecosystems (E) Restored natural communities	Salem & Marblehead harbormasters, Conservation Commissions, private dock owners, MADMF, EPA, ACOE, UNH, SSCW volunteer	(Q1-3) Qualitative survey of eelgrass bed conditions adjacent to dock structures, (Q3) QAPP for quantitative data collection, (Q4) plan for acoustic mapping during 2021 field season (Q4) List of presentations and publications
Merrimack River WQ improvements (Upper North Shore) $10,000 + 85h	***New*** Establish and implement regional goals to improve water quality on the Merrimack River. Oversee and provide administrative and technical support to the MRDC and its members.	(2) Identifying polluted waters and developing plans to restore them (G) Well informed, multisector input into decision making which includes underserved communities	MRWC, NECC, WWTPs, Planning Commissions (MA & NH)	(Q1) Decision making framework in place, (Q4) Formal interstate collaboration established, (Q2-4) priority actions implemented according to framework

Strategy 3.2 *continued*

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Refine and disseminate findings presented in the Seagrass Restoration StoryMap (Metro Boston) 220h	***Ongoing*** Disseminate the results of a project surveying seagrass restoration and management projects in MA to inform future efforts. The findings are presented in an online ArcGIS Story Map, which will be used to engage a variety of audiences. ***New*** Explore opportunities and audiences interested Story Map to include restoration of additional coastal habitats (e.g., oyster reefs)	(7) Protecting large aquatic systems (E) Restored natural communities	SeagrassNet, BHEN, others TBD	(Q2) Summary of comments on the StoryMap garnered from at least three partner networks to solicit feedback, (Q3) StoryMap refined according to feedback, (Q3) Manuscript describing findings submitted to appropriate journal, (Q4) List of potential extensions to the Story Map
State of the Waters: Cape Cod (Cape Cod) 500h	***Ongoing*** Report on the condition of the Cape's coastal and fresh waters and their problems, causes, and possible solutions. Update water report cards, an annual report, website and other outreach materials to serve as a model and promote action to protect and restore water quality. ***New*** Describe needs and identify opportunities for restoring water quality with Atlas of Water Restoration Needs	(6) Protecting coastal waters through the National Estuary Program (C) Improved water quality	Buzzards Bay Coalition, Center for Coastal Studies, Cape Cod Commission, SMAST-UMass-Dartmouth, WBNERR, MBL Ecosystems Center, towns of Chatham, Eastham and Mashpee, CZM, MassBays, MET	(Q1) Final report cards for 2020, (Q1, Q4) Collect WQ data for coastal waters, fresh water bodies, groundwater, drinking water, and other water resources, including in underserved communities, collect data through 2020 for first update in Report Cards, (Q1-4) Convene Advisory Committee, (Q4) Updated outreach materials, including website, presentations, publications, (Q4) Atlas of Water Restoration Needs
Maintaining Adequate Streamflow in First Herring Brook (South Shore) 215h	***Ongoing*** Support the Town of Scituate in the effort to raise their reservoir and provide adequate downstream flow by providing regular feedback for streamflow management and contributing to permitting and outreach efforts.	(7) Protecting large aquatic systems (B) Improved habitat continuity and restored hydrology	Town of Scituate, DER	(Q2)Report on use of seasonal streamflow management tool, (Q1-4) Documentation of support provided to the town

D. Budget

Narrative
These notes refer to **Table 5, *MassBays National Estuary Program Proposed Budget, FFY2020***.

Assumptions – Section 320 funding allocation to MassBays will be $662,500.

Proposed Spending

Salaries for two staff: Executive Director (1.0FTE), and Staff Scientist (0.6FTE). Supplemental funds of $3000 salary for the Staff Scientist will be provided through the EPA MPG grant. The Circuit Rider's salary, fringe, and indirect costs are covered by the EPA Exchange Network Grant.

Fringe benefits: Fringe benefits rate is 38.88% of salaries.

Contractual

- AquaQAPP Operations & Maintenance. Eastern Research Group will provide on-call tech support, and maintain code and hosting for the app once it is launched.

Other Expenses

- Regional Service Providers. Up to $63,000 is allocated to each of the five RSPs. This year we request a total of $314,999 to come from the Section 320 base grant monies.

- Biological Condition Gradient stakeholder process. These funds will be transferred via an Interagency Service Agreement to UMass Boston's School for the Environment to conduct workshops to elicit input from local stakeholders on prioritization of ecosystem targets.

- Communications Support. This line item, set at $6000, is to advance implementation of our Communications Strategic Plan. MassBays' Communications Subcommittee will be engaged to determine priority actions.

- Healthy Estuaries Grant Program. The proposed budget includes $33,125 for grant funding to support implementation of the CCMP. This meets the CCMP measure of 5% of our S.320 allocation to be dedicated to this purpose.

- Meeting expenses. The budget includes a modest allocation of $547 for meeting expenses/light refreshments to support Management Committee meetings, regional workshops for the BCG target review, and a State of the Bays Symposium.

- Shared Agency Expenses. The budget includes $5000 charge-back to the Executive Office of Energy and Environmental Affairs, to cover costs of services including HR support, internet and phones, copier and computer leases, and office supplies.

Travel (see Table 6)

With travel put on hold during the last portion of FFY2019, MassBays did not spend all funds allocated to travel for that year. The current budget assumes that $2000 will be carried over to cover this coming year's travel expenses, leaving a request of $1249 for FFY2020. The following costs are anticipated:

- NEP national meetings
    - Fall 2020 Tech Transfer meeting will be held virtually (i.e., no travel expenses are budgeted)
    - Spring 2021 Annual Meeting, Washington DC (Director)

- Other Professional Development Conferences
    - Assuming limited travel expenses and registration fees for professional development and regional conferences, New England-wide (Director and Staff Scientist)
- Regional meetings, workshops, and site visits
    - CCMP implementation oversight, regional education & outreach workshops, grantee site visits, etc., MassBays-wide (Director and Staff Scientist)
- NE Regional NEP meetings
    - Visits for collaboration and joint programming discussions, New England-wide (Director and Staff Scientist)

Indirect Charges
The indirect cost rate is 11.15%. This rate was negotiated in accordance with the OMB "Super-Circular" and with regulations promulgated by the Commonwealth Secretary of Administration and Finance. A copy of the current indirect rate cost agreement is attached to this application. The indirect rate is charged to expenditures relating to personnel and contracts. It is charged at the same rate for federal and non-federal personnel and contracts.

Matching Funds
Subgrantees. Regional partners, in their scopes of work to serve as RSPs to MassBays, identify sources of match for the program. Direct match of at least 50% is required; this year a total of $223,662 is offered by the RSPs. An additional 25% match ($8281) will be realized on the Healthy Estuaries Grant line item.

Program Match. Several of the RSPs have also identified a substantial cash and in-kind match linked directly to the implementation of the CCMP, a total of $272,481. Sources of match offered include revenue from membership, state and local grants, private foundations, etc., as well as the work of staff within these organizations on projects specifically related to our estuarine restoration and conservation efforts.

In addition, $7234 in-kind services are anticipated from Management Committee and Subcommittee members not already accounted for in the RSP match; MassBays will receive $150,000 state funds this fiscal year from DEP for implementation of the Massachusetts Coastal Condition Assessment; and finally, UMass Boston has offered $11,000 in-kind match for the BCG stakeholder process. These items total $168,234.

Table 5. MassBays National Estuary Program Proposed Budget, FFY2020

FFY20 Section 320 Grant Application: Massachusetts Bays National Estuary Program Proposed Expenditures and Confirmed Non-Federal Match		
Personnel		
subtotal, salaries	**$**	**165,275**
Fringe benefits 38.88% (salaries)	$	64,259
subtotal, fringe	**$**	**64,259**
Travel See detail, Table 6	$	1,239
subtotal, travel	**$**	**1,249**
Contractual		
ERG, AquaQAPP O&M	$	15,000
subtotal, contractual	**$**	**15,000**
Other		
Regional Service Providers (RSPs)	$	314,999
Biological Condition Gradient stakeholder process	$	36,945
Communications support	$	6000
Healthy Estuaries Grant Program	$	33,125
meeting expenses/light refreshments	$	547
shared agency expenses	$	5,000
subtotal, other	**$**	**396,617**
Total Direct	**$**	**642,399**
Indirect 11.15% (salaries & contracts)	$	20,101
subtotal, indirect	**$**	**20,101**
Total Request, FFY20	**$**	**662,500**

Matching Funds		
Subgrantees direct match	$	231,943
Program Match	$	440,715
Total Match, FFY20	**$**	**672,658**

Table 6. Proposed Travel spending FFY2020

destination (# travelers)	airfare	meals	ground transportation	lodging	registration
NEP national meeting, Spring 2021 (Washington DC), 4d (1 traveler)	250	100	100	600	350
Other PD/Regional Conferences (2 attendees)		60	200	150	400
Regional meetings and site visits for CCMP implementation, regionwide education & outreach, etc. (assume two trips per site)			1 car @ $.53/mi		
Salem x2	0	0	42.4		
Newburyport x2	0	0	84.8		
Kingston x2	0	0	76.32		
Wellfleet x2	0	0	216.24		
Worcester (DEP) x4	0	0	216.24		
Chelmsford (EPA) x4	0	0	129.32		
NE Regional NEP meetings (2 travelers)			1 car @ $.53/mi		
Portland ME	0	0	116.6		
Narragansett RI	0	0	84.8		
Durham NH	0	0	72		
subtotals	$ 250	$ 160	$ 1,339	$ 750	$ 750
Total Travel					**$ 3,249**
Less FFY2019 carry-over funds					(2,000)
Total Travel Request					**$ 1,249**

Appendix 1. Progress toward CCMP Goals

Goal 1. MassBays provides new resources to support research and management in the Bays			
Action/Activity	**Target Year**	**Completed**	**Output**
1.1.a Identify gaps in data sets.	2019	2020	master list of research needs shared on website
	2020		online tool soliciting data & research needs from stakeholders
	2022, 2025, 2028		updated master lists of research needs and data gaps
1.1.b. Prioritize addressing gaps per need, completeness and reliability of new and existing data, relevance to U/U communities, application to SotB reporting, and potential policy applications	2021, 2022, 2025, 2028		List of priority data gaps included in each SotB, EDA update, with evidence of input from diverse stakeholders
1.1.c Maintain Estuarine Delineation and Assessment as a record of current data availability	2019	2020	ArcGIS Story Map posted on website
	2022		EDA 3.0
	2026		EDA 4.0
1.1.d Provide input re: data needs to entities funding and conducting monitoring and restoration	yearly	2019	EPA MPG grant ($50,000), DEP MCCA ISA ($150,000)
	yearly	2/20 HE grant RFR	announcements to audiences (Monitoring coordinators' network, academia, watershed associations, MOTN, MACC) for research and monitoring actions.
1.2.a Implement a MassBays-wide monitoring framework that incorporates long-term monitoring program data and makes data and findings available to the public	2019	2018	Inventory of trends & conditions monitoring programs in the Bays
		2019	cyanobacteria (CC), nutrients in Salem Sound (LNS), salt marsh condition (SS, NS), herring runs (SS, CC), invasive spp (NS, SS), WQ (NS, SS), coastal acidification (LNS), invasive spp (NS, SS)
	2021		document baseline conditions for future comparisons
	2021		MassBays ecosystem tracking incorporates QA'd data sets
	2023		MassBays ecosystem tracking data sets are stored in EPA's WQX
1.2.b Convene and partner with citizen monitoring coordinators, researchers, QA/QC agency staff, others to support and improve monitoring outputs	2020		AquaQAPP launched
	2019	2019	Circuit Rider hired
	ongoing	2019-2020	meetings, webinars hosted to present available resources, solicit needs
	biennially		MassBays/partners present at CSA conferences
	2021		present at E-Enterprise conference
1.3.a Analyze connections among datasets and trends to inform reporting, actions, and policies	ongoing	2019	Strategic monitoring plan finalized, including data analysis guidance
		2020	WQX templates adapted to standardize metadata
1.3.b Provide SotB reporting at multiple scales	ongoing	2019	Cape Cod State of the Waters published

Goal 2. MassBays reaches all planning-area municipalities with actionable information about coastal habitats			
Action/Activity	**Target Year**	**Completed**	**Output**
2.1.a Identify, evaluate, and support research regarding effectiveness of conservation & restoration activities	2020, 2022, 2024, 2026, 2028	2020	Healthy Estuaries Grants awarded, 5% budget set aside for 2022
		2020	results of 2018-2020 grants posted online
		2019	impacts of dam removals assessed (SS)
2.1.b Test and implement innovative monitoring (including rapid field assessments) and restoration approaches	ongoing	2020	gathered real-time monitoring data using SeaTrac's autonomous vessel, funded ditch remediation proof-of-concept research via HE grant
		2019	designed and implemented a citsci-based eelgrass assessment protocol
		2018-2020	funded design & build of new coastal acidification monitoring instrument
2.1.c Support cross-sector information sharing	ongoing; 2020, 2022, 2025, 2027	2019	Field visits hosted by RSPs carried out across the planning area
		2020	MassBays ED served as Chair of ANEP
2.2.a Revise and disseminate existing, effective education and outreach materials, and develop new materials and outreach efforts, providing context and integrating multiple sources	ongoing	2020	City Nature Challenge - Boston Area expanded to Cape Cod
2.2.b Engage with local decisionmakers and residents for habitat protection and restoration to mitigate impacts of increased freshwater inputs, SLR, and storm surges , including promoting nature-based approaches	ongoing	2020	multiple presentations and publications delivered to target audiences
		2020	multiple partnerships, assistance to municipalities documented
		2020	initiated and engaged in new efforts to increase attention to WQ issues in the Merrimack River (UNS)
2.2.c Communicate about climate change impacts and vulnerabilities at the local level	ongoing	2020	lecture series, site-specific outreach implemented (LNS, MB, SS)

Goal 2. *continued* MassBays reaches all planning-area municipalities with actionable information about coastal habitats			
Action/Activity	**Target Year**	**Completed**	**Output**
2.3.a Review and adjust Management Committee composition to ensure diverse, representative input to MassBays' planning	2019-2021		
2.3.b Engage partners who work with U/U communities in MassBays' regions	ongoing	2019	hosted presentation by Chelsea Greenspace, engaged with UMass Boston's Sustainability Lab to explore opportunities
		2019	network analysis of restoration collaboration and input (MB)

Goal 3. MassBays provides regular and locally informed State of the Bays reporting that reflects the unique characteristics of MassBays assessment units (embayments, rocky shore, barrier beach), and documents progress toward target conditions.			
Action/Activity	**Target Year**	**Completed**	**Output**
3.1.a Identify indicators and metrics to describe diversity and similarities among embayments, rocky shore, beaches and dunes across MassBays' planning area	2020, 2021, 2024, 2027	2020	embayment categories finalized, ecotypes assessed
3.1.b Identify target conditions to guide management and restoration decisions	2019 - 2021	2020	historic data collected, stakeholder process determined
3.2.a Develop and implement action plans according to targets	2021 and ongoing		
3.2.b Promote activities to improve and protect estuarine values and resources	2020 and ongoing	2020	State of the Waters: Cape Cod employed to spark resource
		ongoing	maintain adequate streamflow in First Herring Brook (SS), eelgrass restoration (UNS), invasive spp removal (NS)
3.2.c Measure and report on progress toward targets	2021 and ongoing		
3.3.a Conduct evaluation of organizational and programmatic impact	PE 2023, 2028; Comm eval 2025,2029		
3.3.b Establish and support collaborative efforts in MassBays' regions that increase opportunities to leverage new resources	ongoing	2019	2:1 leverage on EPA investment